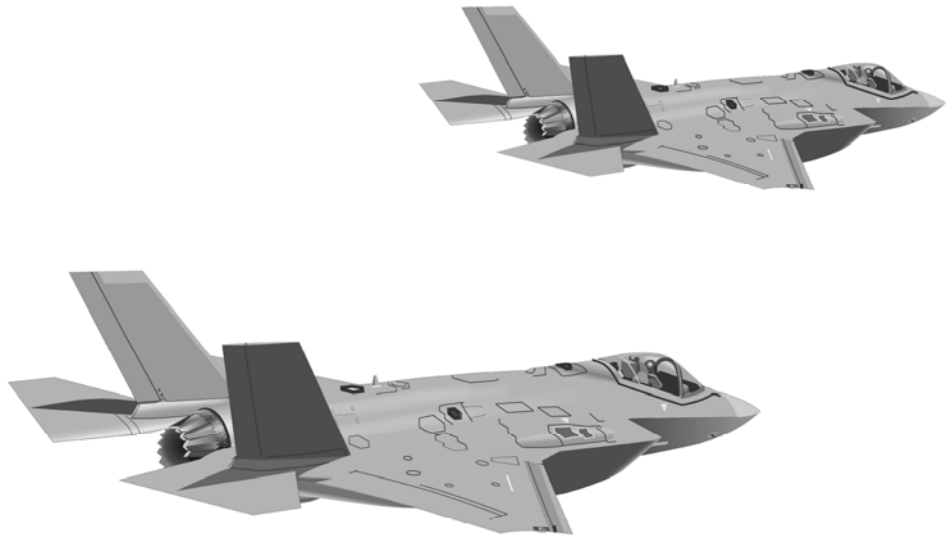


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<b>13. SUPPLEMENTARY NOTES</b>					
<b>14. ABSTRACT</b> <p>This environmental assessment/overseas environmental assessment (EA/OEA) provides NEPA documentation for the initial operational test and evaluation (IOT&amp;E) phase of the joint strike fighter (JSF) F-35 aircraft development program. The JSF test activities are proposed for nine locations: Edwards AFB, California; R-2508 Complex, California; NAWCWD China Lake, California; NTC Fort Irwin, California; NAWCWD Point Mugu Ranges, California; MCAS Yuma, Arizona; NTTR, Nevada; UTSR, Utah; WSMR, New Mexico.</p> <p>The proposed action consists of basing up to 20 F-35 aircraft at Edwards AFB, and conducting pilot training and proficiency and flight tests in the airspace of the 8 test ranges listed above. Flight testing activities include inert and live weapon releases, and air-to-air live missile shots. All flight tests of the F-35 would originate and terminate at Edwards AFB.</p>					
<b>15. SUBJECT TERMS</b> Environmental Assessment; Overseas Environmental Assessment; F-35; Joint Strike Fighter; Initial Operational Test and Evaluation; IOT&E; Finding of No Significant Impact; FONSI; Edwards AFB; R-2508; NAWCWD China Lake; NTC Fort Irwin; MAWCWS Point Mugu; MCAS Yuma; NTTR; UTTR; WSMR; MCAGCC Twentynine Palms; NAS Lemoore; Volk Field ANGB; Alpena					
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**FINAL  
ENVIRONMENTAL ASSESSMENT/  
OVERSEAS ENVIRONMENTAL  
ASSESSMENT**  
September 2009



**F-35 JOINT STRIKE FIGHTER  
INITIAL OPERATIONAL TEST AND  
EVALUATION**



**FINAL ENVIRONMENTAL ASSESSMENT/  
OVERSEAS ENVIRONMENTAL ASSESSMENT FOR THE  
F-35 JOINT STRIKE FIGHTER INITIAL OPERATIONAL TEST AND EVALUATION**

**September 2009**



**FINDING OF NO SIGNIFICANT IMPACT (FONSI)  
FOR THE F-35 JOINT STRIKE FIGHTER INITIAL OPERATIONAL TEST AND EVALUATION**

The attached environmental assessment/overseas environmental assessment (EA/OEA) analyzes the potential environmental impacts associated with implementation of the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E) program. Support aircraft operations and effects are addressed as part of the baseline activities. The Proposed Action would entail basing 20 F-35 aircraft (6 F-35As [U.S. Air Force], 6 F-35Bs [U.S. Marine Corps], 6 F-35Cs [U.S. Navy], and 2 F-35Bs [UK]) at existing facilities at Edwards Air Force Base (AFB), and conducting flights in the R-2508 Complex; Naval Air Warfare Center Weapons Division (NAWCWD) China Lake, California; NAWCWD Point Mugu Ranges, California; Nevada Test and Training Range (NTTR), Nevada; Utah Test and Training Range (UTTR), Utah; White Sands Missile Range (WSMR), New Mexico; National Training Center (NTC) Fort Irwin, California; and Marine Corps Air Station (MCAS) Yuma Ranges, Arizona and California. The Proposed Action also includes several deployment demonstrations that would occur at several locations. Currently identified preferred locations for conducting deployment demonstrations are Alpena Combat Readiness Training Center (CRTC), Michigan; Edwards AFB; Eglin AFB, Florida; Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California; MCAS Yuma; Naval Air Station (NAS) Lemoore, California; Volk Field Air National Guard Base (ANGB), Wisconsin; and aircraft carriers operating on the NAWCWD Point Mugu Ranges.

F-35 IOT&E activities would occur during a 2-year period currently anticipated to be from mid 2012 to mid 2014. The No-Action Alternative would be not to conduct the F-35 JSF IOT&E program.


Aspects of socioeconomics, airspace, land use, aesthetics, transportation, utilities, hazardous materials management, geology and soils, water resources, and cultural resources would not be affected by proposed activities. Air emissions from Proposed Action activities would be *de minimis* and would not be regionally significant. Noise levels at the Edwards AFB airfield would increase due to F-35 take-offs and landings during IOT&E. This increase in noise levels would not exceed the significance threshold established by the Federal Aviation Administration. Noise produced by the F-35 is expected to be comparable to that from other jet fighters currently operating on the test ranges. The proposed deployment demonstrations would slightly increase the overall frequency of aircraft flight noise events at each site, but with a barely perceptible noise increase in each flight event. The proposed JSF IOT&E activities would be consistent with existing ongoing range activities, including aircraft flight altitudes, speeds, overflight avoidance areas, and temporal restrictions. Target launches and weapons releases would use only established launch and target locations. Wildlife on the test ranges are expected to be acclimated to these routine range activities. The increased noise from F-35 overflight is not expected to have a significant impact to biological resources.

Cumulative impacts arising from past and present projects or activities are, by their very nature, accounted for through the establishment of baselines portraying existing conditions. JSF test activities would not be additive to the total operations currently conducted at the proposed test ranges because of range scheduling procedures for test programs. Similar test activities would be conducted at the ranges and JSF, being a higher priority user, would replace lower priority activity during IOT&E, as necessary. There is limited potential for JSF activities to be additive if range operations capacity has not been attained when the range space scheduling request is received.

Activities associated with the F-35 Aircraft Force Development Evaluation and Weapons School Beddown at Nellis AFB would overlap with the F-35 IOT&E activities in the NTTR. No minor or major cumulative impacts on the NTTR were identified.

As a result of the analysis of impacts in the EA/OEA, it was concluded that the activities to be conducted under the Proposed Action would not have a significant effect on human health or the natural environment. This FONSI is based on the attached EA/OEA, which has been independently evaluated by the Air Force and determined to adequately and accurately discuss the need, environmental issues, and impacts of the proposed project. This EA/OEA provides sufficient evidence and analysis to determine that an environmental impact statement is not required.

Signed:

  
STEPHEN T. SARGEANT  
Major General, USAF  
Commander

Date:

1 Oct 2009

**COVER SHEET**  
**FINAL ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT**  
**F-35 JOINT STRIKE FIGHTER INITIAL OPERATIONAL TEST AND EVALUATION**

- a. Responsible Agency: Department of the Air Force
- b. Proposed Action: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E).
- c. Written comments and inquiries regarding this document should be directed to: Charles Brown, HQ AFCEE/TDBS, 3300 Sydney Brooks, Brooks City-Base, Texas 78235-5112, (210) 536-4203.
- d. Report Designation: Final Environmental Assessment/Overseas Environmental Assessment (EA/OEA).
- e. Abstract: The purpose of the Proposed Action is to test the operational capabilities of the operationally representative F-35 aircraft under realistic "combat" conditions. This EA/OEA analyzes the potential environmental impacts from basing 20 F-35 aircraft at Edwards AFB, conducting pilot training and proficiency flights and test flights in several test ranges in the western U.S., and conducting a series of deployment demonstration at multiple locations. Test flight activities would include weapons missions at several ranges. Operations would occur within existing airspace and test ranges and would adhere to all existing restrictions and operating procedures established for these activities. No construction or modification of facilities would occur. The No-Action Alternative would be not to conduct the JSF IOT&E program.

This EA/OEA analyzes the potential environmental impacts from proposed activities on air quality, noise, and biological resources. The Air Force has determined that the impacts to these resources would not be significant.



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## TABLE OF CONTENTS

	<u>Page</u>
1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION.....	1-1
1.1 BACKGROUND.....	1-1
1.2 PURPOSE AND NEED .....	1-2
1.3 LOCATION OF THE PROPOSED ACTION .....	1-7
1.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT.....	1-8
1.5 RELATED ENVIRONMENTAL DOCUMENTS .....	1-12
1.6 APPLICABLE REGULATORY REQUIREMENTS AND COORDINATION .....	1-12
2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION.....	2-1
2.1 NO-ACTION ALTERNATIVE .....	2-1
2.2 DESCRIPTION OF THE PROPOSED ACTION .....	2-1
2.2.1 Description of the F-35 Aircraft.....	2-2
2.2.2 Joint Strike Fighter Initial Operational Test and Evaluation Activities .....	2-2
2.2.2.1 Basing the F-35 Aircraft.....	2-2
2.2.2.2 Test Range Activity .....	2-4
2.2.2.3 Deployment Demonstrations.....	2-8
2.2.3 Joint Strike Fighter Initial Operational Test and Evaluation Activities by Location .....	2-10
2.2.3.1 Edwards Air Force Base.....	2-10
2.2.3.2 R-2508 Complex .....	2-11
2.2.3.3 Naval Air Warfare Center Weapons Division China Lake.....	2-13
2.2.3.4 Naval Air Warfare Center Weapons Division Point Mugu .....	2-14
2.2.3.5 Nevada Test and Training Range .....	2-17
2.2.3.6 Utah Test and Training Range .....	2-20
2.2.3.7 White Sands Missile Range .....	2-22
2.2.3.8 National Training Center Fort Irwin .....	2-24
2.2.3.9 Marine Corps Air Station Yuma Ranges .....	2-25
2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY .....	2-27
2.4 COMPARISON OF ENVIRONMENTAL IMPACTS .....	2-28
3.0 AFFECTED ENVIRONMENT .....	3-1
3.1 DESCRIPTION OF LOCATIONS.....	3-1
3.1.1 Edwards Air Force Base.....	3-1
3.1.2 Test Ranges .....	3-1
3.1.2.1 R-2508 Complex .....	3-1
3.1.2.2 Naval Air Warfare Center Weapons Division China Lake.....	3-2
3.1.2.3 Naval Air Warfare Center Weapons Division Point Mugu .....	3-2
3.1.2.4 Nevada Test and Training Range .....	3-3
3.1.2.5 Utah Test and Training Range .....	3-3
3.1.2.6 White Sands Missile Range .....	3-4
3.1.2.7 National Training Center Fort Irwin .....	3-4
3.1.2.8 Marine Corps Air Station Yuma.....	3-5
3.1.3 Deployment Demonstration Locations .....	3-5
3.1.3.1 Alpena Combat Range Test Center .....	3-5
3.1.3.2 Eglin Air Force Base.....	3-6
3.1.3.3 Marine Corps Air Ground Combat Center Twentynine Palms .....	3-6
3.1.3.4 Naval Air Station Lemoore .....	3-6
3.1.3.5 Volk Field Air National Guard Base.....	3-7

## TABLE OF CONTENTS (CONTINUED)

	<u>Page</u>
3.2 AIR QUALITY .....	3-7
3.3 NOISE .....	3-13
3.3.1 Edwards Air Force Base.....	3-16
3.3.2 Test Ranges .....	3-18
3.3.2.1 R-2508 Complex .....	3-18
3.3.2.2 Naval Air Warfare Center Weapons Division China Lake .....	3-19
3.3.2.3 Naval Air Warfare Center Weapons Division Point Mugu .....	3-19
3.3.2.4 Nevada Test and Training Range .....	3-19
3.3.2.5 Utah Test and Training Range .....	3-20
3.3.2.6 White Sands Missile Range .....	3-20
3.3.2.7 National Training Center Fort Irwin .....	3-21
3.3.2.8 Marine Corps Air Station Yuma Ranges .....	3-21
3.3.3 Deployment Demonstration Locations .....	3-21
3.4 BIOLOGICAL RESOURCES.....	3-21
3.4.1 Edwards Air Force Base.....	3-22
3.4.2 Test Ranges .....	3-23
3.4.2.1 R-2508 Complex .....	3-23
3.4.2.2 Naval Air Warfare Center Weapons Division China Lake .....	3-26
3.4.2.3 Naval Air Warfare Center Weapons Division Point Mugu .....	3-26
3.4.2.4 Nevada Test and Training Range .....	3-29
3.4.2.5 Utah Test and Training Range .....	3-32
3.4.2.6 White Sands Missile Range .....	3-35
3.4.2.7 National Training Center Fort Irwin .....	3-37
3.4.2.8 Marine Corps Air Station Yuma.....	3-38
3.4.3 Deployment Demonstration Locations .....	3-39
3.4.3.1 Alpena Combat Readiness Training Center.....	3-40
3.4.3.2 Eglin Air Force Base.....	3-40
3.4.3.3 Marine Corps Air Ground Combat Center Twentynine Palms ...	3-41
3.4.3.4 Naval Air Station Lemoore .....	3-41
3.4.3.5 Volk Field Air National Guard Base.....	3-41
3.5 ENVIRONMENTAL JUSTICE .....	3-42
4.0 ENVIRONMENTAL CONSEQUENCES .....	4-1
4.1 NO-ACTION ALTERNATIVE .....	4-1
4.2 PROPOSED ACTION .....	4-1
4.2.1 Air Quality .....	4-1
4.2.1.1 Edwards Air Force Base.....	4-2
4.2.1.2 Test Ranges .....	4-3
4.2.1.3 Deployment Demonstration Locations .....	4-3
4.2.1.4 General Conformity Applicability Determination.....	4-4
4.2.1.5 Greenhouse Gas Emissions.....	4-5
4.2.2 Noise.....	4-7
4.2.2.1 Edwards Air Force Base.....	4-8
4.2.2.2 Test Ranges .....	4-11
4.2.2.3 Deployment Demonstration Locations .....	4-12
4.2.3 Biological Resources .....	4-13
4.2.3.1 Edwards Air Force Base.....	4-13
4.2.3.2 Test Ranges .....	4-13

## TABLE OF CONTENTS (CONTINUED)

	<u>Page</u>
4.2.3.2.1 R-2508 Complex.....	4-14
4.2.3.2.2 Naval Air Warfare Center Weapons Division China Lake .....	4-14
4.2.3.2.3 Naval Air Warfare Center Weapons Division Point Mugu .....	4-15
4.2.3.2.4 Nevada Test and Training Range .....	4-16
4.2.3.2.5 Utah Test and Training Range .....	4-16
4.2.3.2.6 White Sands Missile Range .....	4-17
4.2.3.2.7 National Training Center Fort Irwin .....	4-17
4.2.3.2.8 Marine Corps Air Station Yuma Ranges .....	4-17
4.2.3.3 Deployment Demonstration Locations .....	4-18
4.2.4 Environmental Justice .....	4-18
4.3 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS.....	4-18
4.4 COMPATIBILITY OF THE PROPOSED ACTION WITH OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL LAND USE PLANS AND POLICIES .....	4-18
4.5 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY .....	4-19
4.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES .....	4-19
4.7 CUMULATIVE ENVIRONMENTAL CONSEQUENCES .....	4-19
5.0 CONSULTATION AND COORDINATION .....	5-1
6.0 LIST OF PREPARERS AND CONTRIBUTORS.....	6-1
7.0 DISTRIBUTION.....	7-1
8.0 REFERENCES.....	8-1

## APPENDIXES

- Appendix A - Noise Impact Modeling - Edwards Air Force Base
- Appendix B - Air Emissions Analysis
- Appendix C - JSF IOT&E Site Narrowing Study
- Appendix D - IOT&E Activity Detail
- Appendix E - Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment Comments

## LIST OF FIGURES

	<u>Page</u>
2.2-1 Joint Strike Fighter IOT&E Locations .....	2-6
2.2-2 Edwards AFB, Nearby Test Ranges, and Associated Airspace, California .....	2-12
2.2-3 Naval Air Warfare Center Weapons Division Point Mugu Sea Range, California .....	2-16
2.2-4 Nevada Test and Training Range, Nevada and Utah .....	2-18
2.2-5 Utah Test and Training Range, Utah and Nevada .....	2-21
2.2-6 White Sands Missile Range, New Mexico .....	2-23
2.2-7 Marine Corps Air Station Yuma and Ranges, Arizona and California .....	2-26
3.3-1 Edwards AFB Baseline CNEL Contours .....	3-17
4.2-1 Edwards AFB Proposed Block 2 Contours .....	4-9
4.2.2 Edwards AFB Proposed Block 3 Contours .....	4-10

## LIST OF TABLES

	<u>Page</u>
2.2-1 F-35 Total Sorties/Flight Hours .....	2-3
2.2-2 Overview of JSF IOT&E Flight Activities .....	2-4
2.2-3 JSF IOT&E Activity Type by Location .....	2-5
2.2-4 JSF IOT&E F-35 Sorties at Edwards AFB .....	2-11
2.2-5 JSF IOT&E Flight Activities at R-2508 Complex .....	2-13
2.2-6 JSF IOT&E Flight Activities at NAWCWD China Lake .....	2-14
2.2-7 JSF IOT&E Weapons Missions at NAWCWD China Lake .....	2-15
2.2-8 JSF IOT&E Flight Activities at NAWCWD Point Mugu Ranges .....	2-15
2.2-9 JSF IOT&E Weapons Missions at NAWCWD Point Mugu Ranges .....	2-17
2.2-10 JSF IOT&E Flight Activities at NTTR .....	2-19
2.2-11 JSF IOT&E Weapons Missions at NTTR .....	2-20
2.2-12 JSF IOT&E Flight Activities at UTTR .....	2-20
2.2-13 JSF IOT&E Weapons Missions at UTTR .....	2-22
2.2-14 JSF IOT&E Flight Activities at WSMR .....	2-22
2.2-15 JSF IOT&E Weapons Missions at WSMR .....	2-24
2.2-16 JSF IOT&E Flight Activities at NTC Fort Irwin .....	2-24
2.2-17 JSF IOT&E Flight Activities at MCAS Yuma Ranges .....	2-25
3.2-1 National and California Ambient Air Quality Standards .....	3-8
3.2-2 NAAQS Attainment Status for Proposed JSF IOT&E Locations .....	3-10
3.2-3 De Minimis Thresholds in Nonattainment Areas .....	3-11
3.2-4 Emission Inventories for Applicable Nonattainment Regions .....	3-12
3.3-1 HUD Site Acceptability Standards .....	3-15
3.3-2 2005 Edwards AFB Baseline Noise Contour Areas .....	3-18
3.3-3 Deployment Demonstration Location Existing Flight Operations .....	3-22
3.4-1 Federally Listed Animal Species for the R-2508 Complex Area, California .....	3-23
3.4-2 Federally Listed Animal Species for the Point Mugu Sea Range Area .....	3-28
3.4-3 Federally Listed Animal Species for the NTTR Area, Nevada and Utah .....	3-32

## LIST OF TABLES (CONTINUED)

	<u>Page</u>
3.4-4 Federally Listed Animal Species for the UTTR Area, Nevada and Utah .....	3-35
3.4-5 Federally Listed Animal Species for the WSMR Area, New Mexico.....	3-37
3.4-6 Federally Listed Animal Species MCAS Yuma Ranges Area, Arizona and California .....	3-39
3.4-7 Federally Listed Animal Species for Alpena County, MI.....	3-40
3.4-8 Federally Listed Animal Species for Okaloosa County, FL.....	3-40
3.4-9 Federally Listed Animal Species for San Bernardino County (Desert Portion Only), CA.....	3-41
3.4-10 Federally Listed Animal Species for Kings County, CA.....	3-41
3.4-11 Federally Listed Animal Species for Juneau County, WI.....	3-41
 4.2-1 Total Emissions at Edwards AFB.....	 4-3
4.2-2 Total Emissions within Test Range Areas .....	4-3
4.2-3 Total Emissions at Deployment Demonstration Locations .....	4-4
4.2-4 Applicable De Minimis Threshold.....	4-5
4.2-5 Nonattainment Pollutants Annual Emissions .....	4-6
4.2-6 Average Ability To Perceive Changes in Noise Levels.....	4-7
4.2-7 F-35 Sorties by Location .....	4-8
4.2-8 Noise Contour Areas Edwards AFB.....	4-11
4.2-9 Comparison of Overflight SEL (dBA) at 1,000 Feet Under Flight Path.....	4-11
4.2-10 F-35 Flight Operations Comparison.....	4-12

## ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFI	Air Force Instruction
AFFTC	Air Force Flight Test Center
AFOTEC	Air Force Operational Test and Evaluation Center
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
ANGB	Air National Guard Base
ATCAA	Air Traffic Control Assigned Airspace
BO	biological opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CATEX	categorical exclusion
CEQ	Council on Environmental Quality
CGTO	Consolidated Group of Tribes and Organizations
CINMS	Channel Islands National Marine Sanctuary
CINP	Channel Islands National Park
CNEL	community noise equivalent level
CO	carbon monoxide
CONUS	continental United States
CFR	Code of Federal Regulations
CRTC	Combat Readiness Training Center
CTOL	Conventional Take-off and Landing
CV	carrier variant
dB	decibel
dBA	A-weighted decibel
DNL	day/night noise level
DOD	Department of Defense
DT	Developmental Test
DT&E	Developmental Test and Evaluation
EA	environmental assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FIC	Federal Interagency Committee
FOL	forward operating location
FONSI	Finding of No Significant Impact
ft	foot
FY	fiscal year
GSE	ground support equipment
HUD	Housing and Urban Development
INRMP	Integrated Natural Resources Management Plan
IOT&E	Initial Operational Test and Evaluation
JSF	Joint Strike Fighter
KPP	key performance parameters
$L_{dnmr}$	Onset Rate-Adjusted Monthly Day-Night Average Sound Level
LEIS	Legislative Environmental Impact Statement
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
MCAGCC	Marine Corps Air Ground Combat Center

MCAS	Marine Corps Air Station
MMPA	Marine Mammal Protection Act
MOA	military operations area
MRTFB	Major Range and Test Facility Base
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
msl	mean sea level
MTF	main test facility
NAAQS	National Ambient Air Quality Standards
NAFR	Nellis Air Force Range
NAIP	Nellis American Indian Program
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NAWCWD	Naval Air Warfare Center Weapons Division
NEPA	National Environmental Policy Act
NMFS	National Marine Fishery Service
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxide
NTC	National Training Center
NTTR	Nevada Test and Training Range
NWR	National Wildlife Refuge
O <sub>3</sub>	ozone
OEA	overseas environmental assessment
ORD	Operational Requirements Document
PAO	Poly Alpha Olefin
Pb	lead
PM <sub>2.5</sub>	particulate matter less than or equal to 2.5 microns in diameter
PM <sub>10</sub>	particulate matter less than or equal to 10 microns in diameter
ppm	part per million
ROI	region of influence
SCB	Southern California Bight
SEL	sound exposure level
SF	square foot
SGR	sortie generation rate
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
STOVL	Short Take-off and Vertical Landing
TEMP	Test and Evaluation Master Plan
UAV	unmanned aerial vehicle
U.S.	United States
U.S.C.	United States Code
UK	United Kingdom
USFWS	U.S. Fish and Wildlife Service
UTTR	Utah Test and Training Range
VOC	volatile organic compound
WMA	wildlife management area
WSMR	White Sands Missile Range



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## 1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

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This environmental assessment/overseas environmental assessment (EA/OEA) analyzes the potential environmental consequences of conducting the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E) program. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States [U.S.] Code [U.S.C.] 4321 et seq.), the Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*, and Air Force policy and procedures (32 CFR Part 989). The provisions of NEPA apply to major federal actions and their associated impacts that occur in the U.S. and within 12 nautical miles of its shores. The provisions of EO 12114 apply to major federal actions and their associated impacts that occur outside 12 nautical miles from U.S. shores.

### 1.1 BACKGROUND

The JSF program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF was conceptualized in the summer of 1993 when the Secretary of Defense reviewed the Air Force, Navy, and Marine strike fighter proposals and determined that a single strike fighter program should be created. In 1995, Congress approved the program as a Major Defense Acquisition Program.

The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and IOT&E phases. DT&E is the classic flight test phase. It is conducted in a laboratory-type environment, which is very methodical, intricately structured, and closely monitored to control risk and incrementally assess the technical capabilities, airworthiness, limitations, and safety of the system. DT&E progressively expands the system operating envelope by meticulously exploring and validating the design capabilities for the critical data needed to support advancing to the IOT&E phase. IOT&E missions flow DT&E-cleared test points into operational or combat-type mission scenarios without the "laboratory-type environment." IOT&E expands the knowledge base on the aircraft's capabilities in order to evaluate more complicated and demanding scenarios as stepwise DT&E tests further define the operating envelope or explore new capabilities (like mid-air refueling). The DT&E phase supports the decision whether to proceed to the IOT&E phase. IOT&E is designed to test the operational capabilities of the operationally representative aircraft under realistic "combat" conditions. It is conducted prior to the full-scale production of the aircraft.

Although the DT&E phase precedes the IOT&E phase, the time frames of the two phases overlap. IOT&E can begin to operationally evaluate system performance after DT&E tests have verified the technical capabilities and limitations needed to conduct a primary operational mission. Thereafter, DT&E objectives precede the dependent IOT&E objectives and these are inextricably linked through IOT&E.

The environmental impacts of the DT&E phase of the JSF program were analyzed by the Joint Strike Fighter Program Office in the *Joint Strike Fighter System Development and Demonstration Developmental Test Program Final Environmental Assessment/Overseas Environmental Assessment* (DT EA/OEA) (January 2007). The DT EA/OEA analyzed JSF activities at the following locations:

#### East Coast Primary Test Location

- Naval Air Station (NAS) Patuxent River, Maryland/Virginia Capes Operating Area of the Atlantic Warning Area

#### West Coast Primary Test Location

- Edwards Air Force Base (AFB), Air Force Flight Test Center (AFFTC), California to include using the airspace and ranges of:
  - Naval Air Warfare Center, Weapons Division (NAWCWD) China Lake, California
  - Naval Air Warfare Center, Weapons (now NAWCWD), Point Mugu California
  - White Sands Missile Range (WSMR), New Mexico
  - Nevada Test and Training Range (NTTR), Nellis AFB, Nevada

#### Other Ancillary Test Locations

- Naval Air Engineering Station, Lakehurst, New Jersey
- Eglin AFB, Air Armament Center, Florida
- Lockheed Martin Aeronautics, Ft. Worth, Texas

The DT EA/OEA resulted in a Finding of No Significant Impact (FONSI) that was signed in January 2007.

This EA/OEA addresses activities that would occur during the IOT&E test phase of the JSF Program. Subsequent environmental analysis will be conducted by Nellis AFB on the effects from transferring and adding the 6 F-35As to their inventory. Receiving Navy and Marine installations will also prepare subsequent environmental analyses on the effects from transferring and adding the 6 F-35Cs and 6 F-35Bs to their respective inventories; the United Kingdom (UK) variants will be subject to complying with their own environmental laws upon completion of the IOT&E program.

## 1.2 PURPOSE AND NEED

The purpose of the Proposed Action is twofold: (1) to satisfy the statutory and regulatory requirements pursuant to 10 U.S.C. 2399, Department of Defense (DOD) Directive 5000.01, DOD Instruction 5000.02, and DOD Directive 3200.11,

and (2) to evaluate the effectiveness, compatibility, and performance of the JSF against other fighters, ground targets, surface targets, and also when providing close air support to ground forces.

The needs of the action are to conduct the tests at locations that would facilitate the evaluation of the weapon system.

**Narrowing:** Narrowing is a process that evaluates an alternative's ability to fulfill the action's purpose and need. The purpose and need statement is a declaration of the broad goals and objectives of the JSF IOT&E effort. Developing solutions or alternatives based solely on the information provided in the purpose and need statement could result in an infinite range of promising and impractical alternatives. NEPA and its companion regulation require us to develop and identify reasonable alternatives to a proposed action. In determining the scope of alternatives to be considered, emphasis is placed on what is "reasonable". Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than what is simply desirable. Selection criteria are based on the purpose and need statement and are used to develop and narrow the range of alternatives. In effect it provides the mechanism to differentiate reasonable alternatives from unreasonable alternatives. There are two forms of selection criteria: required and desired. Required criteria are based on statutory, technical, operational, and economic considerations. Desired criteria are based on features or conditions the proponent would like to have. Desired criteria are not used to develop alternatives, but to narrow the range of reasonable alternatives.

As alternatives are developed they are evaluated against the narrowing criteria. Those that satisfy the purpose and need statement are further analyzed in the EA, those satisfying the purpose but not the need are considered but eliminated from further analysis, and those that don't satisfy the purpose or need are identified as unreasonable alternatives.

**Narrowing Criteria:** The statutory and regulatory requirements provide the policies and procedures that DOD must comply with to successfully complete IOT&E. The criteria used to evaluate the JSF's effectiveness, compatibility, and performance are described in the program's Operational Requirements Document (ORD) and defined in the 1 January 2009 F-35 Lighting II Joint Strike Fighter Test and Evaluation Master Plan (TEMP) Third Revision. The IOT&E portion of the TEMP is prepared by the Joint Operational Test Team which includes the U.S. Air Force, U.S. Navy, U.S. Marines, UK Royal Navy, and UK Royal Air Force. Air Force Operational Test and Evaluation Center (AFOTEC) is the lead and proponent for the JSF IOT&E action.

- 1) 10 U.S.C. 2399 defines operational test and evaluation and limits the production of the weapon systems to low-rate production levels until IOT&E is completed. It also prohibits testing based exclusively on computer modeling and simulations. IOT&E must be conducted in an operationally realistic combat environment and the Director of Operational Test and Evaluation of the DOD must submit a report at the conclusion of operational test and evaluation to the

Secretary of Defense, the Under Secretary of Defense for Acquisition, Technology, and Logistics, and the congressional defense committees indicating whether the results of such test and evaluation confirm that the items or components actually tested are effective and suitable for combat before the program can proceed beyond low rate initial production.

- 2) DOD Directive 5000.01 and DOD Instruction 5000.02 establish the framework of the acquisition process. Every DOD system is developed from an ORD that describes the desirable objectives the system should meet and the key performance parameters (KPP). The ORD also defines the technical and operational thresholds the system must meet. DOD Instruction 5000.02 also mandates taking full advantage of existing DOD ranges, facilities, and other resources in the planning and execution of the test. Based on this, the consideration of Major Range and Test Facility Base (MRTFB) locations is one of the key criteria in support of the purpose and need for the Proposed Action. However, since the aircraft will be deployed overseas at some point in its life, some testing that cannot be economically duplicated at the MRTFB or to take advantage of environmental conditions such as cold weather, will need to be conducted at other DOD installations. Those installations would also need to replicate forward operating location (FOL) conditions encountered overseas. This instruction also requires the development of a TEMP. Specific system performance activities are developed by AFOTEC in consultation with the Marines and the Navy. The F-35 variants' performance tests include, but are not limited to, the ability to attack, provide air support, conduct reconnaissance, and conduct sortie generation (ability to launch, recover, reload, and launch again and again) which are evaluated against the technical parameters established in the TEMP. Most of the tests identified in the 2009 TEMP, such as aerial combat against other fighters, attacking ground/surface targets, and providing close air support to ground forces, can be conducted at the MRTFB ranges. It is common for test parameters to change as the test results are analyzed and as the test program evolves.
- 3) DOD Directive 3200.11 lists the ranges and bases established to conduct test and evaluation of various weapon systems. They are presented in Enclosure 2 of the directive and in Appendix C Attachment 2, Table C5.1-1 MRTFB Missions and Combat Radius. The selection and use of MRTFB supports the JSF Program Office's purpose of assessing the operation of the F-35 in a variety of realistic combat conditions based on technical specifications, operating criteria, and unique Service (U.S. Navy, U.S. Air Force, U.S. Marine Corps, and UK Royal Navy and Royal Air Force) mission requirements. Note: JSF test activities would not be additive to the total operations currently conducted at the MRTFB. Similar test activities would be conducted at the MRTFB and JSF, being a higher priority user, would replace lower priority activity during IOT&E, as necessary. The major difference would be the type of aircraft or system using MRTFB resources. Dedicated testing is one of the reasons the MRTFB was created. There is

limited potential for JSF activities to be additive if range operations capacity has not been attained when the range space scheduling request is received.

Based on the above, four sets of narrowing criteria were developed; one for narrowing the MRTFB Test Ranges, the second for the MRTFB Main Test Facility (MTF), the third for the Deployment Demonstration FOL Sites, and the fourth for the deployment demonstration cold weather sites. Appendix C, JSF IOT&E Narrowing Process and Results, contains a more detailed description of the results of the narrowing process, the general methodology used, the IOT&E narrowing criteria and rationale, the results of the narrowing process, and appendices containing the tables used in the narrowing process. The following is a description of the Required Criteria and Desired Criteria for each.

#### MRTFB Test Range

##### Required Criteria:

- a) The DOD Test Ranges should be located within the Continental United States (CONUS).
- b) The DOD Test Ranges should have flight test or aerial combat capabilities.
- c) The DOD Test Ranges should be located within the JSF combat radius of the MTF.

##### Desired Criteria:

- a) The preferred DOD Test Range resources and capabilities should satisfy the Critical Operational Issues objective.
- b) Air-Surface Warfare tests should be conducted on a Sea Range (Navy and Marine variants).
- c) JSF variant should use service specific DOD Test Range.
- d) Preferred DOD Test Ranges should be based on the DOD Test Ranges satisfying most of the above.

#### MRTFB Main Test Facility

##### Required Criteria:

- a) The DOD MTF must be located within CONUS.
- b) The DOD MTF must be a Flight Test Center.

##### Desired Criterion:

- a) The preferred DOD MTF should have the most number of DOD Test Ranges within the JSF's combat radius.

## Deployment Demonstration FOL Site

### Required Criteria:

- a) Deployment Demonstration FOL sites should be located at U.S. military installation or joint use with suitable security within CONUS.
- b) Deployment Demonstration FOL sites should have a minimum runway length of 8,000 feet.
- c) Deployment Demonstration FOL sites should be installations that the services use for deployment readiness preparation.
- d) All Deployment Demonstration FOL sites should have adequate ramp space for cargo handling and processing of one to eight C-17s. (Ramp space must be able to support one C-17 at a time for delivering and processing of F-35 logistics and support equipment and hold up to less than or equal to eight C-17s worth of F-35 logistics and support equipment.)
- e) Deployment Demonstration FOL site runways should be suitable for fighter operations.

### Desired Criteria:

- a) Deployment Demonstration FOL sites should be located to enable the JSF to spend more time on range or be a Combat Readiness Training Center (CRTC).

## Deployment Demonstration Cold Weather Site

### Required Criteria:

- a) Deployment Demonstration cold weather sites must be located at US military or joint use installations with suitable security within CONUS.
- b) Deployment Demonstration cold weather sites must have a minimum runway length of 8,000 feet.
- c) Deployment Demonstration cold weather sites should be installations the services use for deployment readiness preparation.
- d) Deployment Demonstration cold weather sites must have adequate ramp space for cargo handling and processing of one to eight C-17s. (Ramp space must be able to support one C-17 at a time for delivering and processing of F-35 logistics and support equipment and hold up to less than or equal to eight C-17s worth of F-35 logistics and support equipment.).
- e) Deployment Demonstration cold weather site runways must be suitable for fighter operations.
- f) Deployment Demonstration cold weather sites should be located in states having a winter low temperature average of 0 to 10 degrees Fahrenheit or colder.

Desired Criteria:

- a) Deployment Demonstration cold weather sites should be located at CRTCs because of the compatibility of activities.

### **1.3 LOCATION OF THE PROPOSED ACTION**

The JSF IOT&E activities consist of three general types of activities (see Section 2.2.2). These activities and the locations where they would occur are identified in the 2009 TEMP and are listed below. These locations are shown on Figure 2.2-1.

Preferred Main Test Facility:

- Edwards AFB, California

Preferred Test Range (airspace only)

Training and Proficiency Flights:

- R-2508 Complex
- NAWCWD Point Mugu Ranges, California
- NTTR, Nevada

Flight Testing:

- R-2508 Complex
- Marine Corps Air Station (MCAS), Yuma Ranges, Arizona
- National Training Center (NTC), Fort Irwin, California
- NAWCWD China Lake, California
- NAWCWD Point Mugu Ranges, California
- NTTR, Nevada
- Utah Test and Training Range (UTTR), Utah
- WSMR, New Mexico

Preferred Deployment Demonstrations:

FOLs

- Edwards AFB
- Eglin AFB, Florida
- Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California
- MCAS Yuma, Arizona
- NAS Lemoore, California
- Carriers on the NAWCWD Point Mugu Ranges
- Volk Field Air National Guard Base (ANGB), Wisconsin



Cold Weather Site

- Alpena CRTC, Michigan

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations (see Section 2.2.2.3).

## 1.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

Consistent with CEQ regulations, the scope of the analysis presented in this EA/OEA is defined by the potential range of environmental impacts that would result from an implementation of the Proposed Action. This document is “issue driven,” in that it concentrates on those resources and locations that may be affected by the JSF IOT&E activities.

### Resources

Resources that have a potential for impact were considered in more detail in order to provide the Air Force decision maker with sufficient evidence and analysis to determine whether or not additional analysis is required pursuant to 40 CFR Part 1508.9. The resources analyzed in more detail are air quality, noise, biological resources, and environmental justice. The affected environment and the potential environmental consequences relative to these resources are described in Chapters 3.0 and 4.0, respectively.

Initial analysis indicated that the JSF IOT&E activities would not result in short- or long-term significant impacts to socioeconomics, airspace, land use, aesthetics, transportation, utilities, hazardous materials management, geology and soils, water resources, and cultural resources. The reasons for not addressing these resources are briefly discussed in the following paragraphs.

**Socioeconomics.** The approximately 581 personnel required for the JSF IOT&E activities at Edwards AFB would be less than the maximum of 642 people required for JSF DT&E activities. IOT&E personnel would represent approximately five percent of the current Edwards AFB population of 12,270. There would be no noticeable change in base or regional population or employment. No personnel increases would occur at any other test location. Socioeconomic impacts of JSF activities analyzed in the DT EA/OEA for the proposed test locations were not found to be significant. Impacts from IOT&E at the test locations would be expected to be similar. Personnel associated with the deployment demonstrations would range from approximately 40 to 175. This would result in a temporary increase in population for a period of 4-15 days at each deployment demonstration location and would not have a noticeable impact on installation or regional population and employment. For these reasons, significant impacts to socioeconomics are not expected and are not analyzed in further detail.

**Airspace.** All aircraft testing activities would occur within the confines of existing airspace currently used for the same types of activities proposed for IOT&E and would be conducted in accordance with all existing range operating restrictions.

F-35 and support aircraft flight activities would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the airspace or corridor in which the F-35 is being flown. No modifications to existing airspace would be made. Supersonic flights would be conducted only in existing supersonic airspace corridors and in approved airspace. All flights would occur in existing military use airspace, with the possible exception of tanker orbit flights, which could occur in adjacent airspace, as approved by the Federal Aviation Administration (FAA). F-35s and support aircraft would use FAA-controlled, high-altitude airspace when transitioning between test location airspaces. These transits would occur at a minimum altitude of 25,000 feet above mean sea level (msl) and at subsonic speeds. For these reasons, significant impacts to airspace are not expected and are not analyzed in further detail.

**Land Use/Aesthetics.** The JSF IOT&E program would use existing facilities at Edwards AFB and at the deployment demonstration installations. There would be no construction of new facilities or renovation of existing facilities that would result in a change to land use or to the current visual environment. No changes to current range use restrictions would be required. For these reasons, significant impacts to land use and aesthetics are not expected and are not analyzed in further detail.

**Transportation.** The approximately 581 personnel required for the JSF IOT&E activities at Edwards AFB would be less than the maximum of 642 people required for JSF DT&E activities. Assuming all 581 personnel required for JSF IOT&E activities would be new personnel added to the existing Edwards AFB population, and that all these personnel would use the same road to access the base, there would be a maximum increase of approximately 580 vehicles to the peak hour volume of traffic. This would represent approximately 15 percent of the capacity of a single traffic lane. In addition, traffic associated with JSF IOT&E personnel would likely be spread among the three main access roads to Edwards AFB. Therefore, the increase in peak hour volume of traffic at any one location on the base would be minimal. Because there would be no changes in personnel at the other test locations, there would be no change in traffic at these installations. Personnel associated with deployment demonstrations would generally remain on the installation during the duration of their deployment and would not generate significant traffic. For these reasons, significant impacts to traffic are not expected and are not analyzed in further detail.

**Utilities.** JSF IOT&E activities would use existing facilities at Edwards AFB. Utility demands would be similar to other test programs. Projected personnel increases and maintenance and test activities would not significantly increase the utility consumption at Edwards AFB. Utility usage associated with personnel and aircraft maintenance and ground operations would not occur at the other test locations. At each deployment demonstration location, utility usage by activities and personnel temporarily stationed there would occur for only the 4- to 15-day duration of the deployment demonstration and would be expected to result in a minimal, temporary increase in utility usage. For these reasons, significant impacts to utility systems are not expected and are not analyzed in further detail.

**Hazardous Materials Management.** Hazardous materials associated with maintenance and operation of the F-35 aircraft would already be managed at Edwards AFB under the DT&E phase of the JSF program. IOT&E activities would not result in a significant change in types and quantities of hazardous materials from DT&E activities and procedures for their management will have been in place prior to the initiation of IOT&E activities. Deployment demonstrations would occur at locations that have fighter mission experience. Types and quantities of hazardous materials required for the F-35 aircraft during deployment would be similar to those required by other fighter aircraft already at these locations. Procedures for the management of materials required by fighter aircraft would be in place and would be applied to the JSF. For these reasons, significant impacts to management of hazardous materials are not expected and are not analyzed in further detail.

**Geology and Soils.** JSF IOT&E activities would not include any construction or other ground-disturbing activities that could alter topography or cause soil erosion or loss of farmland. For these reasons, significant impacts to geology and soils are not expected and are not analyzed in further detail.

**Water Resources.** JSF IOT&E activities would not include any construction or other ground-disturbing activities that would affect surface drainage, surface water quality, or floodplains. No activities that could significantly affect groundwater resources have been identified. For these reasons, significant impacts to water resources are not expected and are not analyzed in further detail.

**Cultural Resources.** JSF IOT&E activities would not include any construction or other ground-disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures would occur. F-35 aircraft flying activities would adhere to all existing range restrictions and would be consistent with the existing environment on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the MRTFB, and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Overall range activity would not be expected to change significantly under the Proposed Action. Therefore, the Proposed Action would not result in a significant change to conditions that would affect Native American or other traditional cultural resources. For these reasons, significant impacts to cultural resources are not expected and are not analyzed in further detail. Consultation with the applicable State Historic Preservation Offices and Native American tribes and groups claiming interest in the range locations proposed for JSF IOT&E activities has been conducted (see Appendix E). A list of agencies consulted is provided in Chapter 5.

## **Locations**

In addition to concentrating on resources that may be affected by implementation of the JSF IOT&E activities, this EA/OEA also considers in more detail those locations that have a potential for impact. These locations are Edwards AFB,

R-2508 Complex, NAWCWD China Lake, NAWCWD Point Mugu Ranges, NTTR, UTTR, NTC Fort Irwin, and MCAS Yuma Ranges. Detailed descriptions of the affected environment and the potential environmental consequences at these locations are presented in Chapters 3.0 and 4.0, respectively.

Significant environmental impacts from IOT&E activities at WSMR are not expected based on the similarity of the scope and intensity of these activities to those analyzed for DT&E at WSMR. As an analysis of a subsequent stage to DT&E, this EA/OEA tiers, as appropriate, from the DT EA/OEA. Based on the findings of that document, the proposed IOT&E activities at WSMR are not expected to result in significant impacts. Therefore, only a minimal discussion and an analysis based on comparison to activities addressed in the DT EA/OEA are provided for WSMR in Chapters 3.0 and 4.0.

In addition, JSF IOT&E program activities between Edwards AFB, the ranges, and the deployment demonstration sites are not expected to result in short- or long-term impacts to any resources. These locations are FAA-controlled airspace. The reasons for either not addressing these locations or for addressing them in less detail are briefly explained in the following paragraphs.

**Transit Activities.** The F-35 aircraft would be based at Edwards AFB and the JSF IOT&E program activities include test activities that would occur in airspace associated with Edwards AFB and other test locations and deployment demonstrations that would occur at several DOD installations. The transit of aircraft between Edwards AFB, the test ranges, and the deployment demonstration locations would involve use of FAA-controlled airspace. However, the transit of military aircraft between these areas is a routine activity that occurs in coordination with the FAA. All JSF IOT&E aircraft transits of this area would occur at a minimum altitude of 25,000 feet above msl and at subsonic speeds. Flight activities would be transitory only; no maneuvers, training, or simulated combat would occur when transiting FAA-controlled airspace. No change to existing conditions would be expected. For these reasons, no significant impacts to any of the resources addressed in this EA/OEA are expected to occur from aircraft transit between military airspaces, and impacts to the transit area are not analyzed further in this EA/OEA.

**Deployment Demonstrations.** Deployment demonstrations consist of temporary deployments ranging from 4 to 15 days of the F-35 aircraft with a tailored logistics support package from Edwards AFB to operate at these locations. A deployment logistics support package would consist of the personnel, support equipment, spare parts, and the transportation assets needed to deliver it all to an austere, remote combat airfield to operate autonomously for an extended period. The packages would be scaled in size (tailored) to meet the requirements demanded by the number of F-35 aircraft and the anticipated resupply catch-up time. Under 32 CFR 989, deployment demonstrations would typically qualify for categorical exclusion (CATEX) from the requirements for environmental impact analysis under NEPA. However, a discussion of deployment demonstrations is included in this EA/OEA in order to provide a more complete picture of the JSF IOT&E activities and to facilitate range planning. Based on the limited scope and duration of the proposed deployment demonstration activities, no significant

impacts are expected and only a minimal discussion and analysis are provided for these locations in Chapters 3.0 and 4.0.

## 1.5 RELATED ENVIRONMENTAL DOCUMENTS

The following environmental analyses are relevant to the JSF IOT&E and are referenced in this EA/OEA.

- *Joint Strike Fighter System Development and Demonstration Developmental Test Program Final Environmental Assessment/Overseas Environmental Assessment* (January 2007)
- *Final Environmental Impact Statement (FEIS) for the Proposed Implementation of the Base Realignment and Closure (BRAC) 2005 Decisions and Related Actions at Eglin AFB, Florida* (August 2008)

Copies of these documents are available from the Air Force. An Air Force Point of Contact is provided in Section C of the Cover Sheet for this document.

## 1.6 APPLICABLE REGULATORY REQUIREMENTS AND COORDINATION

No federal, state, or local permits would be required to implement the JSF IOT&E phase. The following sections summarize the regulatory coordination that has been conducted as part of the environmental analysis for this EA/OEA.

**Air Quality.** Section 176(c) of the Clean Air Act (CAA), and the regulations that implement it, require that Air Force actions occurring in nonattainment or maintenance areas conform to the applicable State Implementation Plan's (SIP's) purpose of attaining the National Ambient Air Quality Standards (NAAQS). As part of this EA/OEA, the Air Force has conducted a conformity applicability analysis for nonattainment areas. The analysis results indicated that emissions associated with the Proposed Action would be in compliance with the applicable SIP. Further conformity determination requirements are not warranted.

**Biological Resources.** In support of the federal Endangered Species Act (ESA), the Air Force solicited comments from the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) concerning the potential impacts to biological resources discussed in this EA/OEA (see Appendix E).

**Cultural Resources.** In support of the National Historic Preservation Act, the Air Force solicited comments from the applicable State Historic Preservation Offices concerning the potential impacts to cultural resources discussed in this EA/OEA (see Appendix E).

## **2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION**

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This chapter describes the No-Action Alternative and the Proposed Action, which is the F-35 JSF IOT&E program. In addition, it includes a brief discussion of the alternatives considered but eliminated from further study, and a comparative analysis of the impacts of the No-Action Alternative and Proposed Action.

### **2.1 NO-ACTION ALTERNATIVE**

Under the No-Action Alternative, the JSF IOT&E program would not be conducted. Activities associated with basing F-35 aircraft at Edwards AFB for IOT&E as described in Section 2.2.2.1 would not occur. IOT&E pilot training and proficiency flights and flight testing of F-35s, as described in Section 2.2.2.2, would not occur at the following MRTFB locations: R-2508 Complex; NAWCWD China Lake; NAWCWD Point Mugu Ranges; NTTR; UTTR; WSMR; NTC Fort Irwin; and MCAS Yuma Ranges. Because JSF IOT&E activities would not occur, current range activities would continue at these locations. Therefore, the No-Action Alternative assumes a continuation of current activities at these locations.

Deployment demonstration activities as described in Section 2.2.2.3 would not occur at any of the preferred locations (i.e., Alpena CRTC, Edwards AFB, Eglin AFB, MCAGCC Twentynine Palms, MCAS Yuma, NAS Lemoore, NAWCWD Point Mugu Ranges, and Volk Field ANGB) or any other suitable locations listed in Appendix C.

10 U.S.C. Section 2399 requires that the DOD and Air Force test major weapon systems before a decision is made to proceed beyond low-rate, initial production. Because low-rate initial production cannot continue indefinitely, the No-Action Alternative is not a reasonable alternative. However, it is evaluated in this EA/OEA because it is required by NEPA regulations (40 CFR 1502.14(d)). In addition, analyzing the No-Action Alternative serves to establish the baseline for the assessment of potential effects of implementing the proposed action.

### **2.2 DESCRIPTION OF THE PROPOSED ACTION**

JSF IOT&E activities would be conducted over a two year period using Blocks 2 and 3 of the low rate production aircraft. Block 2 testing is currently anticipated to occur from mid calendar year 2012 to mid calendar year 2013. Block 3 would occur from mid calendar year 2013 to mid calendar year 2014. The actual start date may change, however, depending on program acceleration or deceleration due to funding or other activities. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities which would occur at multiple locations. The following sections provide descriptions of the F-35 aircraft, the general types of JSF IOT&E activities, and the specific activities that would occur at each location.

### **2.2.1 Description of the F-35 Aircraft**

The F-35 is a single-seat, single-engine aircraft capable of striking and destroying a broad range of targets. The F-35 is designed to fulfill multiple service and multiple role (e.g., air-to-air, air-to-ground) requirements of the U.S. Air Force, U.S. Navy, and U.S. Marine Corps, as well as the UK Royal Navy and Royal Air Force. There are three U.S. variants of the aircraft: F-35A Conventional Take-off and Landing (CTOL); F-35B, Short Take-off and Vertical Landing (STOVL); and F-35C aircraft carrier variant (CV). In addition, a UK variant, the F-35B UK STOVL, would also be tested during IOT&E.

The dimensions of the F-35 are similar to the F-15. The F-35 aircraft variants range from approximately 35 to 43 feet wide, but are all approximately 51 feet long.

The aircraft's propulsion system is the F135, a derivative of the F119-Pratt & Whitney-100 engine that powers the F-22 Raptor aircraft, and the F136, an alternative engine by General Electric currently in development.

### **2.2.2 Joint Strike Fighter Initial Operational Test and Evaluation Activities**

For purposes of this EA/OEA, the JSF IOT&E activities are divided into three general types: 1) main base activities; 2) test range activity including training and proficiency flights and flight testing; and 3) deployment demonstrations. It is common for test parameters to change as the F-35 variants proceed through the various proposed JSF IOT&E activities and time periods; therefore, the flight hours and number of flights evaluated in this EA/OEA represent planned, realistic approximations. However, these approximations may increase or decrease, as needed, during the actual JSF IOT&E. Other types of aircraft would be used to support some of these activities. Weapons would be used as part of some activities. A general description of these activities is provided below. More detailed descriptions of activities by location are provided in Section 2.2.3.

Detailed information on JSF IOT&E flight activities are presented in Table 2.2-1 and in Appendix D. Table 2.2-2 provides an overview of the approximate flying hours associated with these activities. Table 2.2-3 identifies the locations where these activities occur. Figure 2.2-1 shows the locations of the proposed JSF IOT&E locations.

#### **2.2.2.1 Basing the F-35 Aircraft.**

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. A total of 16 aircraft would be based during Block 2 and 20 aircraft during Block 3. The 20 aircraft would consist of 6 F-35As (U.S. Air Force), 6 F-35Bs (U.S. Marine Corps), 6 F-35Cs (U.S. Navy), and 2 F-35Bs (UK). An additional F-35B (UK) would be based at Edwards AFB but would only be flown if another F-35B (UK) is down for maintenance. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft.

Table 2.2-1. F-35 Total Sorties/Flight Hours<sup>(1)</sup>

Location	Block 2								Block 3								TOTAL	
	F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total		F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total			
	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs
Basing																		
Edwards AFB	941	0	915	0	0	0	1,856	0	1,348	0	1,357	0	1,350	0	4,055	0	5,911	0
Test Ranges																		
R-2508 Complex <sup>(2)</sup>	270	430	270	430	0	0	540	860	347	563	347	563	347	563	1,040	1,690	1,580	2,550
NAWCWD China Lake	105	155	105	155	0	0	210	310	180	267	180	267	180	267	540	800	750	1,110
NAWCWD Point Mugu Ranges	110	105	110	105	0	0	220	210	190	180	190	180	190	180	570	540	790	750
NTTR	135	205	135	205	0	0	270	410	233	270	233	270	233	270	700	810	970	1,220
UTTR	105	210	105	210	0	0	210	420	187	367	187	367	187	367	560	1,100	770	1,520
WSMR	5	10	5	10	0	0	10	20	3	7	3	7	3	7	10	20	20	40
NTC Fort Irwin	20	30	20	30	0	0	40	60	23	33	23	33	23	33	70	100	110	160
MCAS Yuma Ranges	165	240	165	240	0	0	330	480	177	260	177	260	177	260	530	780	861	1,260
Subtotal	915	1,385	915	1,385	0	0	1,830	2,770	1,340	1,947	1,340	1,947	1,340	1,947	4,020	5,840	5,850	8,610
Deployment Demonstration Locations																		
Alpena CRTC	0	0	0	0	0	0	0	0	6	17	6	17	0	0	12	34	12	34
Edwards AFB SB	24	59	0	0	0	0	24	59	0	0	0	0	0	0	0	0	24	59
Eglin AFB/Duke Field	0	0	24	19	0	0	24	19	0	0	0	0	0	0	0	0	24	19
MCAGC Twentynine Palms	0	0	0	0	0	0	0	0	0	0	63	90	0	0	63	90	63	90
MCAS Yuma	0	0	0	0	0	0	0	0	0	0	40	32	0	0	40	32	40	32
NAS Lemoore	0	0	0	0	0	0	0	0	0	0	0	0	120	96	120	96	120	96
Volk Field ANGB	34	110	0	0	0	0	34	110	92	268	0	0	0	0	92	268	126	378
L-Class Deployed Ship	0	0	0	0	0	0	0	0	0	0	103	170	0	0	103	170	103	170
CVN Deployed Ship	0	0	0	0	0	0	0	0	0	0	0	0	84	179	84	179	84	179
Subtotal	58	169	24	19	0	0	82	188	98	285	212	309	204	275	514	869	596	1,057
TOTAL	973	1,544	939	1,394	0	0	1,912	2,958	1,438	2,232	1,552	2,256	1,544	2,222	4,534	6,709	6,446	9,667

Notes: <sup>(1)</sup> Some sortie numbers and flight hours may change, it is common for test parameters to change as the testing test results are analyzed and as the test program evolves, however, the total sorties and flight hours should be reasonably stable.

<sup>(2)</sup> R-2508 Complex activities are exclusive of those proposed for NAWCWD China Lake and NTC Fort Irwin.

AFB	=	Air Force Base	NAWCWD	=	Naval Air Warfare Center Weapons Division
ANGB	=	Air National Guard Base	NTC	=	National Training Center
CRTC	=	Combat Readiness Training Center	NTTR	=	Nevada Test and Training Range
CTOL	=	Conventional Take-off and Landing	STOVL	=	Short Take-off and Vertical Landing
CV	=	carrier variant	UK	=	United Kingdom
MCAGCC	=	Marine Corps Air Ground Combat Center	UTTR	=	Utah Test and Training Range
MCAS	=	Marine Corps Air Station	WSMR	=	White Sands Missile Range
NAS	=	Naval Air Station			



**Table 2.2-2. Overview of JSF IOT&E Flight Activities**

	F-35 <sup>(1)</sup>		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours <sup>(2)</sup>	Sorties	Flight Hours <sup>(3)</sup>	Sorties	Flight Hours
Block 2						
Training/Proficiency Flights	630	1,150	0	0	630	1,150
Test Flights	1,200	2,080	550	1,100	1,750	3,180
Deployment Demonstrations	82	270	10	20	92	290
Total Block 2	1,912	3,500	560	1,120	2,468	4,620
Block 3						
Training/Proficiency Flights	1,530	2,750	0	0	1,530	2,750
Test Flights	2,490	4,850	750	1,700	3,240	6,550
Deployment Demonstrations	514	930	20	40	534	970
Total Block 3	4,534	8,530	770	1,740	5,304	10,270
IOT&E Total						
Training/Proficiency Flights	2,160	3,900	0	0	2,160	3,900
Test Flights	3,690	6,930	1,300	2,800	4,990	9,730
Deployment Demonstrations	596	1,200	30	60	626	1,260
Totals	6,446	12,030	1,330	2,860	7,776	14,890

Notes: <sup>(1)</sup> Sorties and flight hours are evenly distributed among the F-35 aircraft.

<sup>(2)</sup> This includes all F-35 flying time including both on-range time and transit time en route between Edwards AFB and test locations. F-35 flight time in the subsequent location-specific tables only includes on-range time; therefore, the total F-35 flying time in all the subsequent tables will not total to these numbers.

<sup>(3)</sup> On-range flying time only.

All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations (see Section 2.2.2.3), would originate and terminate at Edwards AFB. No F-35 aircraft landings/take-offs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of emergency.

### **2.2.2.2 Test Range Activity.**

Test range activities consist of training and proficiency flights and test flights. These two types of flight activities are described below. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range as part of test flights.

#### ***Training and Proficiency Flights.***

Pilot and maintenance initial training and qualification would occur at Eglin AFB. This activity was analyzed for environmental significance in the *Final Environmental Impact Statement for the Proposed Implementation of the Base Realignment and Closure 2005 Decisions and Related Actions at Eglin AFB, Florida*, and is appropriately tiered and will not be further analyzed here.

Edwards AFB-based training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain

**Table 2.2-3. JSF IOT&E Activity Type by Location**

Location	Aircraft Activity					Weapons Missions	
	Basing	Test Range Activity		Deployment Demonstrations	Support Aircraft	Weapon Release	Target Launches/ Air-to-Air Live Missile Shots
		F-35 Training/ Proficiency Flights	F-35 Test Flights				
Edwards AFB	X			X	X <sup>(1)</sup>		
<b>Test Ranges</b>							
R-2508 Complex <sup>(2)</sup>			X				
NAWCWD China Lake			X		X	X	X
NAWCWD Point Mugu Ranges		X	X	X <sup>(3)</sup>		X	X
NTTR		X	X		X	X	
UTTR			X		X		X
WSMR			X		X		X
NTC Fort Irwin			X				
MCAS Yuma Ranges			X				
<b>Deployment Demonstration Locations</b>							
Alpena CRTC				X	X <sup>(1)</sup>		
Eglin AFB				X			
MCACGC Twentynine Palms				X	X <sup>(1)</sup>		
MCAS Yuma				X	X <sup>(1)</sup>		
NAS Lemoore				X	X <sup>(1)</sup>		
Volk Field ANGB				X	X <sup>(1)</sup>		

Notes: <sup>(1)</sup> Support aircraft use is limited to transport to deployment demonstration location.

<sup>(2)</sup> In this analysis, R-2508 Complex does not include NAWCWD China Lake and NTC Fort Irwin because these are considered separate locations.

<sup>(3)</sup> Deployment demonstration would occur at sea on aircraft carriers.

JSF/001



#### EXPLANATION

- 1 Naval Air Station, Lemoore, CA
- 2 Naval Air Warfare Center Weapons Division China Lake, CA
- 3 National Training Center, Fort Irwin, CA
- 4 Edwards Air Force Base, CA
- 5 Naval Air Warfare Center Weapons Division Point Mugu, CA
- 6 Marine Corps Air Ground Combat Center Twentynine Palms, CA
- 7 Marine Corps Air Station, Yuma, AZ

- 8 Nevada Test and Training Range, NV
- 9 Utah Test and Training Range, UT
- 10 White Sands Missile Range, NM
- 11 Volk Field Air National Guard Base, WI
- 12 Alpena Combat Readiness Training Center, MI
- 13 Eglin Air Force Base, FL

Test Range

#### Joint Strike Fighter IOT&E Locations

NOT TO SCALE



**Figure 2.2-1**

pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. A total of approximately 2,160 sorties would be flown for a total of approximately 3,900 hours (2,690 hours on-range flying time). Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of all flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Training and proficiency flights would occur at three areas near Edwards AFB and would primarily use military operations areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAAs). These MOAs/ATCAAs are the airspace associated with R-2508 Complex, NAWCWD Point Mugu Ranges, and NTTR.

### ***Test Flights.***

IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a take-off and landing at Edwards AFB and test activities at one of several test locations. A total of approximately 3,690 F-35 sorties would be flown at several test ranges for a total of approximately 6,930 hours (5,920 flying hours on-range). Approximately 20 percent of the test flight sorties would be flown during the night (i.e., between sunset and sunrise). Only approximately 5 percent of all flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters like the F-18 (representing opposition forces), would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location. Support aircraft would fly a total of approximately 1,330 sorties for 2,860 hours on-range.

All flights would occur in existing military use airspace, with the possible exception of tanker orbit flights, which could occur in adjacent airspace, as approved by the FAA, and deployment demonstration cross-country flights. Aircraft would use FAA-controlled, high-altitude airspace when transitioning between Edwards AFB and test ranges. These transits would occur at a minimum altitude of 25,000 feet above msl and at subsonic speeds.

Stores (such as missiles, bombs, fuel tanks, refueling or electronic countermeasure pods, countermeasures [flares], guns, etc.), would be used as part of proposed test flight activities. Stores would be internally or externally mounted on the F-35 or aircraft support suspension and release equipment, and may or may not be released (or separated from the aircraft) during various

proposed IOT&E activities. Most of the weapon-related stores (bombs and missiles) would be inert, with most missiles fired having a live solid rocket motor but an inert warhead.

Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. More detailed information on weapons missions is presented in Appendix D. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures. AFOTEC will ensure that the ordnance and quantity used on a particular range is authorized for use by the ranges at which the tests will be conducted. Since IOT&E testing is not additive to testing already being conducted on the MRTFB ranges, the environmental impact of the ordnance on their ranges for the types and quantities IOT&E is planning has already been analyzed the NEPA documents prepared by the respective ranges on the activities they conduct.

Test flight activities could occur at the following locations: R-2508 Complex, NAWCWD China Lake, NAWCWD Point Mugu Ranges, NTTR, UTTR, WSMR, NTC Fort Irwin, and MCAS Yuma Ranges.

### **2.2.2.3 Deployment Demonstrations.**

Deployment demonstrations, with the exception of the one that would occur at Eglin AFB (see below), consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. As discussed in Section 1.4, under 32 CFR 989, deployment demonstrations would typically qualify for CATEX from the requirements for environmental impact analysis under NEPA. However, a discussion of deployment demonstrations is included in this EA/OEA in order to provide a more complete picture of the JSF IOT&E activities and to facilitate range planning. The analysis of deployment demonstrations is limited to the preferred locations. However, should a deployment demonstration be proposed for a location not addressed in this EA/OEA, subsequent NEPA analysis would be conducted as appropriate.

Brief CTOL, STOVL, and CV deployments would conduct limited operations from other bases that are representative of forward operating/austere and/or cold weather operational conditions. Deployments would realistically simulate wartime deployed activity to evaluate deployed operational test suitability (logistics) and effectiveness (flight operations) performance parameters. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of at least 1 C-17 and no more than 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 120 sorties (270 hours).

Deployment demonstration flights would occur in the military airspace (restricted areas and MOAs) in the vicinity of the deployment location, but could use whatever ranges, MOAs, or restricted areas that are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Deployment site sortie generation rate (SGR) flight operations would blend seamlessly into customary local operating procedures. The deployment would observe local area restrictions and preferences and would use DOD Flight Information Publications procedures for departure and arrival routings. Flights would maintain positive contact with the Air Route Traffic Control Center, terminal area, and tower for standard air traffic control in the terminal area, en route, and for training range entry and exit. Ground maintenance operations would be conducted independent of the assets owned by the deployment demonstration installation, using deployed equipment, supplies, and consumables.

F-35 deployment demonstration flights would include captive carry weapons missions. Most flight time would be logged above 20,000 feet above msl. Approximately 20 percent of the deployment demonstration sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Approximately 11 deployment demonstrations would be conducted during IOT&E. Three of these would occur during Block 2. These include a deployment demonstration activity would occur at Eglin AFB using F-35 aircraft that are already based there. The F-35 would be flown from the Eglin AFB airfield to Duke Field on a daily basis for three days of field carrier landing practice. At the end of this activity, the F-35 aircraft would be flown to Edwards AFB to continue IOT&E activities from there.

An in-place deployment demonstration onto and from a remote runway area of Edwards AFB would also be conducted during Block 2. This deployment demonstration would be conducted as an operational test deployment risk reduction tool, to refine the logistics support package (e.g., support equipment, spare parts, and personnel and transportation requirements), and to preview the weapon system's operational performance using the support package alone. Also during Block 2, a CTOL CONUS (dry land) deployment would collect preliminary logistics data for an initial SGR assessment.

Block 3 would see dry land deployments for the CTOL and U.S. STOVL variants and shipboard deployments for the U.S. and UK STOVL and CV variants on L class, CVF and CVN ships, respectively. SGR demonstrations would be conducted during the U.S. variant deployments to collect suitability data for verification of the SGR key performance parameters.

Many DOD facilities are capable of supporting a JSF deployment demonstration. The currently identified preferred locations where these would occur include Alpena CRTC, Edwards AFB, Eglin AFB, MCAGCC Twentynine Palms, MCAS Yuma, NAS Lemoore, and Volk Field ANGB, and carrier deployments afloat in

the Point Mugu Ranges. This EA/OEA addresses deployment demonstrations at these locations. However, installations identified as capable of supporting a JSF deployment demonstration, and that therefore have the potential to be used as part of IOT&E for this purpose, are identified in Appendix C, Table C5.3-1.

### **2.2.3 Joint Strike Fighter Initial Operational Test and Evaluation Activities by Location**

JSF IOT&E phase activities are described in the following sections by location. A number of locations that are proposed for deployment demonstrations only are discussed briefly at the end of this section.

#### **2.2.3.1 Edwards Air Force Base.**

JSF IOT&E activities that would occur at Edwards AFB include staging the F-35 aircraft and a deployment demonstration. In addition, all pilot training and proficiency flights and test flights that would occur on test ranges would originate and terminate at Edwards AFB. Pilot training and proficiency flights and test flights that would occur in airspace associated with Edwards AFB are discussed in the next section (Section 2.2.3.2.).

**Basing F-35 Aircraft.** During IOT&E, 16 F-35 aircraft would be staged at Edwards AFB during Block 2, and 20 F-35 aircraft during Block 3. Existing dedicated JSF facilities and base facility assets that support other ongoing flight testing and maintenance activities at Edwards AFB would be used.

No new facilities or modifications to existing facilities would be required for IOT&E activities.

Ground based tests at Edwards AFB would include static operation of the F-35 aircraft engine either on the airfield, on a test stand, or in an enclosed building (test cell).

Ground support equipment (GSE) that would be used during IOT&E would be similar to those required for DT and would include:

- Hydraulics Cart Environmental Control System Cooling
- Poly Alpha Olefin (PAO) Cart
- Light Cart
- Tow Tractor
- Ground Generators MD-4 (-270VDC)
- MJ2A Jammer/Weapons Loaders
- Flight Line/Support Trucks
- Fuel Trucks
- Oil Cart
- Air Cart - Hi PAC/Low PAC.

Personnel. The IOT&E program would require approximately 462 personnel during Block 2 and approximately 581 personnel during Block 3.

**Test Range Activities.** Test range activities that would occur in airspace associated with Edwards AFB are discussed in Section 2.2.3.2 below. However, all F-35 IOT&E test range flights, including both pilot training and proficiency flights and test flights, would originate and terminate at Edwards AFB. Therefore, test range activities exclude the take-off and landing portion of each test range F-35 sortie. Table 2.2-4 provides a summary of the JSF IOT&E sorties at Edwards AFB. A total of approximately 2,160 training and proficiency sorties and approximately 3,690 test sorties would be flown during IOT&E. F-35 aircraft carrying weapons as part of missions at other test locations and during the deployment demonstration would take off and land at Edwards AFB, and transit through Edwards AFB airspace en route to other ranges.

**Table 2.2-4. JSF IOT&E F-35 Sorties at Edwards AFB**

	<b>Sorties<sup>(1)</sup></b>
Block 2	1,856
Block 3	4,055
IOT&E Total	5,911

Note: <sup>(1)</sup> Includes all IOT&E pilot training and proficiency and test range F-35 sorties and an estimated number of deployment demonstration F-35 sorties including a deployment demonstration that may occur on Edwards AFB plus the initial and final sortie of F-35s used for deployment demonstrations at other locations.

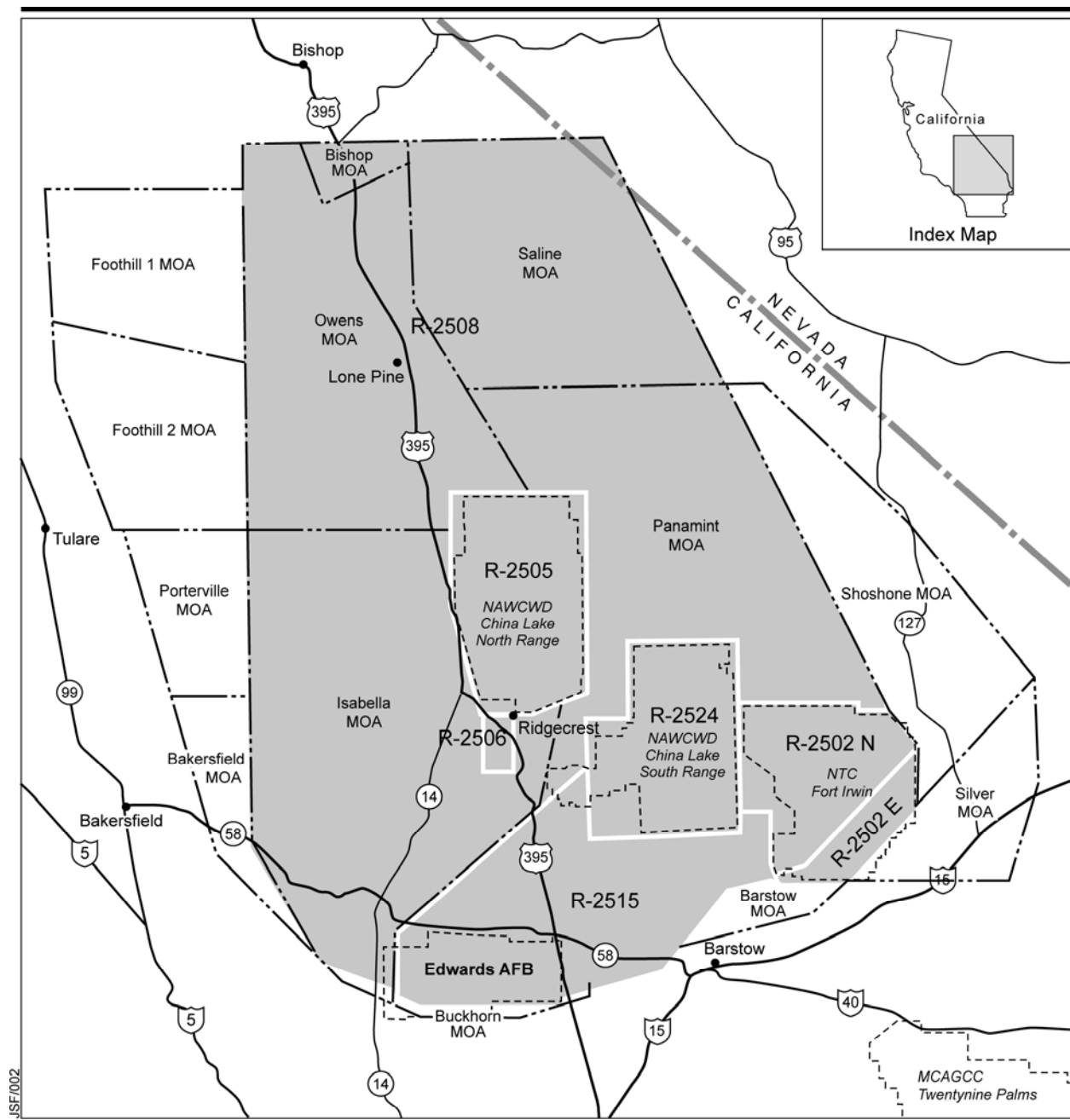
**Deployment Demonstration.** The F-35 and support aircraft (C-17 for transport) and personnel that would be deployed during each of the JSF IOT&E deployment demonstrations, with the exception of the one that would occur at Eglin AFB, would depart from Edwards AFB at the beginning of the demonstration and return to Edwards AFB at the end; however, all other deployment demonstration activities would occur at the deployment demonstration locations. Therefore, the initial take-off and final landing of each F-35 deployment demonstration sortie is part of the activity occurring at Edwards AFB. An estimated number of deployment demonstration sorties originating and terminating at Edwards AFB is included in the total F-35 sorties at Edwards AFB in Table 2.2-4.

In addition, Edwards AFB is currently identified as one of the preferred locations for deployment demonstration. This would likely occur at a remote location on the base. A discussion of deployment demonstration activities is provided in Section 2.2.2.3.

#### **2.2.3.2 R-2508 Complex.**

The R-2508 Complex includes the R-2508, R-2502N, R-2502E, R-2505, R-2506, R-2524, and R-2515 restricted airspace areas plus adjacent MOAs and ATCAAs (Figure 2.2-2). It overlies Edwards AFB, NAWCWD China Lake, and NTC Fort Irwin. JSF IOT&E activities proposed for the R-2508 and R2515 and adjacent MOAs and ATCAAs are planned separately from those proposed at NAWCWD





#### EXPLANATION

- |  |                       |  |                              |
|--|-----------------------|--|------------------------------|
|  | State Boundary        |  | MOA Military Operations Area |
|  | Restricted Airspace   |  | MOA Boundary                 |
|  | Military Installation |  |                              |
|  | U.S. Highway          |  |                              |
|  | Interstate Highway    |  |                              |
|  | State Highway         |  |                              |

0 17 34 Miles



### Edwards AFB, Nearby Test Ranges, and Associated Airspace, California

Figure 2.2-2

China Lake and NTC Fort Irwin. Therefore, in this EA/OEA the term R-2508 Complex excludes airspace at NAWCWD China Lake (R-2505, R2506, and R 2524) and NTC Fort Irwin (R-2502N, R-2502E). The R-2508 Complex would be used for test range activities including both pilot training and proficiency flights and test flights. Table 2.2-5 provides a summary of the JSF IOT&E activities proposed for the R-2508 Complex.

**Table 2.2-5. JSF IOT&E Flight Activities at R-2508 Complex**

	F-35		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours	Sorties	Flight Hours	Sorties	Flight Hours
Block 2						
Training/Proficiency	210	380	0	0	210	380
Test Flights <sup>(1)</sup>	330	480	0	0	330	480
Total Block 2	540	860	0	0	540	860
Block 3						
Training/Proficiency	510	910	0	0	510	910
Test Flights <sup>(1)</sup>	530	780	0	0	530	780
Total Block 3	1,040	1,690	0	0	1,400	1,690
IOT&E Total						
Training/Proficiency	720	1,290	0	0	720	1,290
Test Flights <sup>(1)</sup>	860	1,260	0	0	860	1,260
Totals	1,580	2,550	0	0	1,580	2,550

Note: <sup>(1)</sup> Some of these activities may occur at MCAS Yuma Ranges.

**Pilot Training and Proficiency Flights.** Approximately 720 pilot training and proficiency flights totaling approximately 1,300 flight hours would occur in the R-2508 Complex.

**Test Flights.** A total of approximately 860 F-35 test flights for a total of approximately 1,260 flying hours would occur in the R-2508 Complex airspace. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for R-2508 Complex test flights.

Some of the flight test activities proposed for this area may also occur at MCAS Yuma Ranges (see Section 2.2.3.9). The numbers of flights that would occur in each of these areas has not yet been determined. For the purposes of this EA/OEA, the total number is assumed for both of these locations. However, because this number includes the total test activity level that would occur in both the Edwards AFB airspace and the MCAS Yuma Ranges, the actual numbers that would occur at either location would be less.

### **2.2.3.3 Naval Air Warfare Center Weapons Division China Lake.**

JSF IOT&E activities proposed for NAWCWD China Lake include test flights. Test flight activities at NAWCWD China Lake would include support aircraft flights and captive carry weapon, air-to-ground weapon release, and air-to-air live missile shot missions. No ground activities except for the launch of targets as part of the air-to-air live missile shot tests would occur at NAWCWD China Lake.

Approximately 750 F-35 sorties, totaling 1,100 flight hours would occur at NAWCWD China Lake during the 2-year duration of JSF IOT&E. Table 2.2-6 provides a summary of the JSF IOT&E activities proposed for NAWCWD China Lake.

**Table 2.2-6. JSF IOT&E Flight Activities at NAWCWD China Lake**

	F-35		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours	Sorties	Flight Hours	Sorties	Flight Hours
Block 2						
Training/Proficiency	0	0	0	0	0	0
Test Flights	210	310	280	550	490	860
Total Block 2	210	310	280	550	490	860
Block 3						
Training/Proficiency	0	0	0	0	0	0
Test Flights	540	800	350	700	890	1,500
Total Block 3	540	800	350	700	890	1,500
IOT&E Total						
Training/Proficiency	0	0	0	0	0	0
Test Flights	750	1,100	630	1,250	1,380	2,350
Totals	750	1,100	630	1,250	1,380	2,350

A total of approximately 630 support aircraft sorties would be flown for a total of approximately 1,250 hours in NAWCWD China Lake airspace. The types of aircraft that may be used to support IOT&E activities include: fighter and attack, tankers, helicopters, reconnaissance and surveillance, unmanned aerial vehicles (UAVs), and bombers.

All F-35 and support aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the NAWCWD China Lake airspace. No modifications to existing airspace would be made.

Approximately 50 missions would include releases of both live and inert weapons. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures.

Five aerial targets would be launched from NAWCWD China Lake, and a total of five air-to-air live missile shots would occur. Table 2.2-7 provides a summary of JSF IOT&E weapons missions proposed for NAWCWD China Lake.

#### **2.2.3.4 Naval Air Warfare Center Weapons Division Point Mugu.**

JSF IOT&E activities proposed for NAWCWD Point Mugu Ranges include: pilot training and proficiency flights; test flights; and a deployment demonstration. These activities would occur within the Navy's Pacific Range Sea Range located off the coast of Point Mugu (Figure 2.2-3). No ground activities would occur at NAWCWD Point Mugu; however, weapons would be released and targets would

**Table 2.2-7. JSF IOT&E Weapons Missions at NAWCWD  
China Lake**

Block 2	
Air-to-Ground Weapon Releases	16
Aerial Target Launches & Air-to-Air Live Missile Shots	2
Block 3	
Air-to-Ground Weapon Releases	37
Aerial Target Launches & Air-to-Air Live Missile Shots	3
IOT&E Total	
Air-to-Ground Weapon Releases	53
Aerial Target Launches & Air-to-Air Live Missile Shots	5

be launched during air-to-air live missile shot weapon missions on the Sea Range.

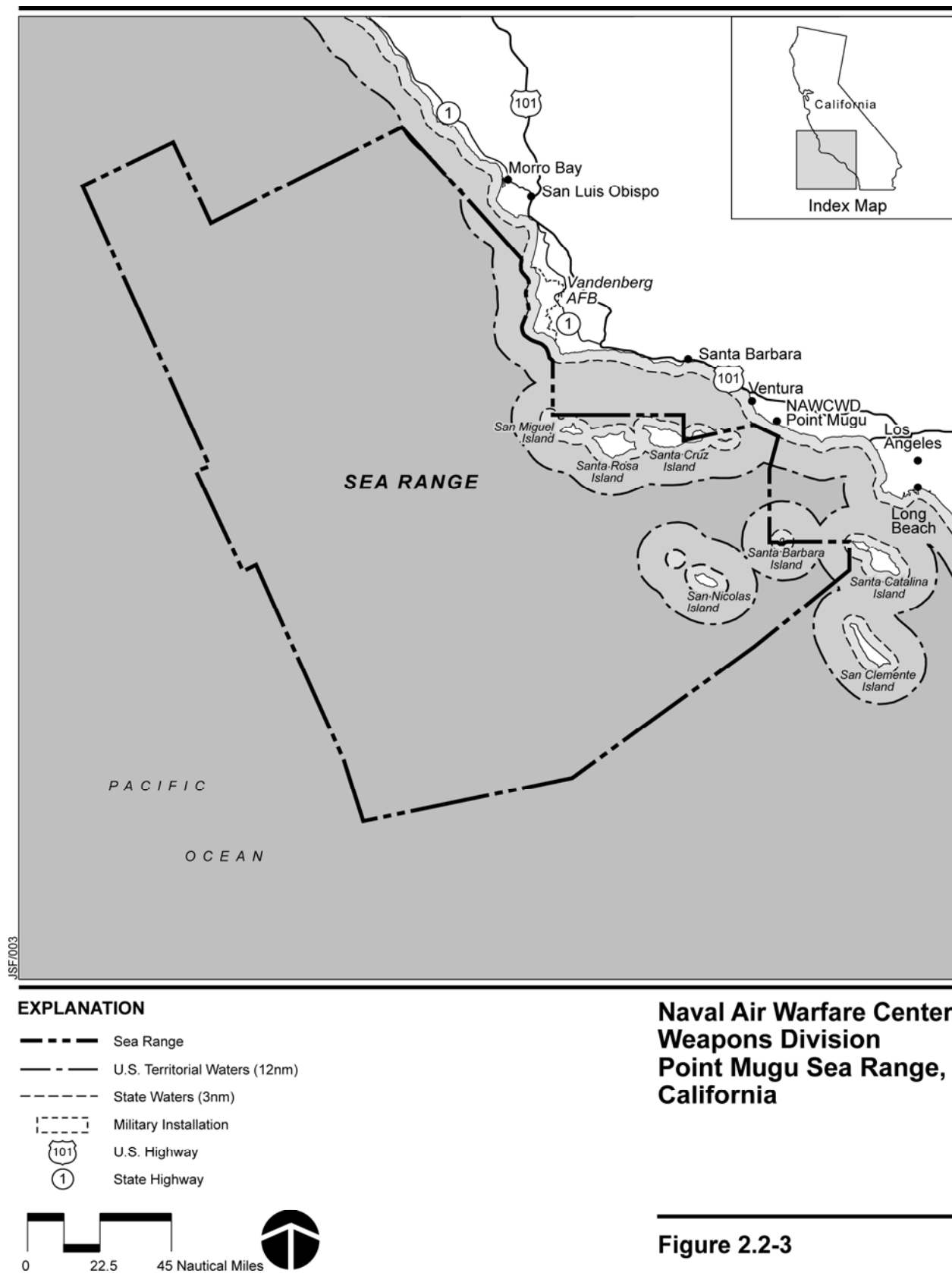
A total of approximately 790 F-35 sorties totaling 750 flight hours, most of which would be training/proficiency flights, would occur in the Sea Range during the 2-year duration of JSF IOT&E. Table 2.2-8 provides a summary of the JSF IOT&E activities proposed for NAWCWD Point Mugu.

**Table 2.2-8. JSF IOT&E Flight Activities at NAWCWD Point Mugu  
Ranges**

	F-35		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours	Sorties	Flight Hours	Sorties	Flight Hours
Block 2						
Training/Proficiency	210	200	0	0	210	200
Test Flights	10	10	0	0	10	10
Total Block 2	220	210	0	0	220	210
Block 3						
Training/Proficiency	510	480	0	0	510	480
Test Flights	60	60	0	0	60	60
Total Block 3	570	540	0	0	570	540
IOT&E Total						
Training/Proficiency	720	680	0	0	720	680
Test Flights	70	70	0	0	70	70
Totals	790	750	0	0	790	750

**Pilot Training and Proficiency Flights.** All IOT&E F-35 pilot training and proficiency flights would originate and terminate at Edwards AFB. Approximately 720 total sorties would be flown in the Sea Range for a total of approximately 680 flight hours.

**Test Flights.** JSF IOT&E test flight activities that would occur at NAWCWD Point Mugu Ranges consist of air-to-air missile tests. These would include F-35 aircraft flights, aerial target launches, and air-to-air live missile shots. F-35 aircraft based at Edwards AFB would fly over the Sea Range. F-35 aircraft would not land or take off at NAWCWD Point Mugu, except in an emergency situation. A total of



approximately 70 F-35 sorties would be flown. No support aircraft would be flown.

The aerial targets would be launched from and recovered at NAWCWD Point Mugu. Approximately 22 aerial targets (BQM-74, BQM-167, UAV, LO, SUV, Threat D) would be launched, and 21 air-to-air live missile shots (AIM-120, AIM-9X, and ASRAAM) would occur. Table 2.2-9 provides a summary of weapon missions at NAWCWD Point Mugu Ranges.

**Table 2.2-9. JSF IOT&E Weapons Missions at NAWCWD Point Mugu Ranges**

Block 2	
Air-to-Ground Weapon Releases	2
Aerial Target Launches & Air-to-Air Live Missile Shots	2
Block 3	
Air-to-Ground Weapon Releases	2
Aerial Target Launches & Air-to-Air Live Missile Shots	20
IOT&E Total	
Air-to-Ground Weapon Releases	4
Aerial Target Launches & Air-to-Air Live Missile Shots	22

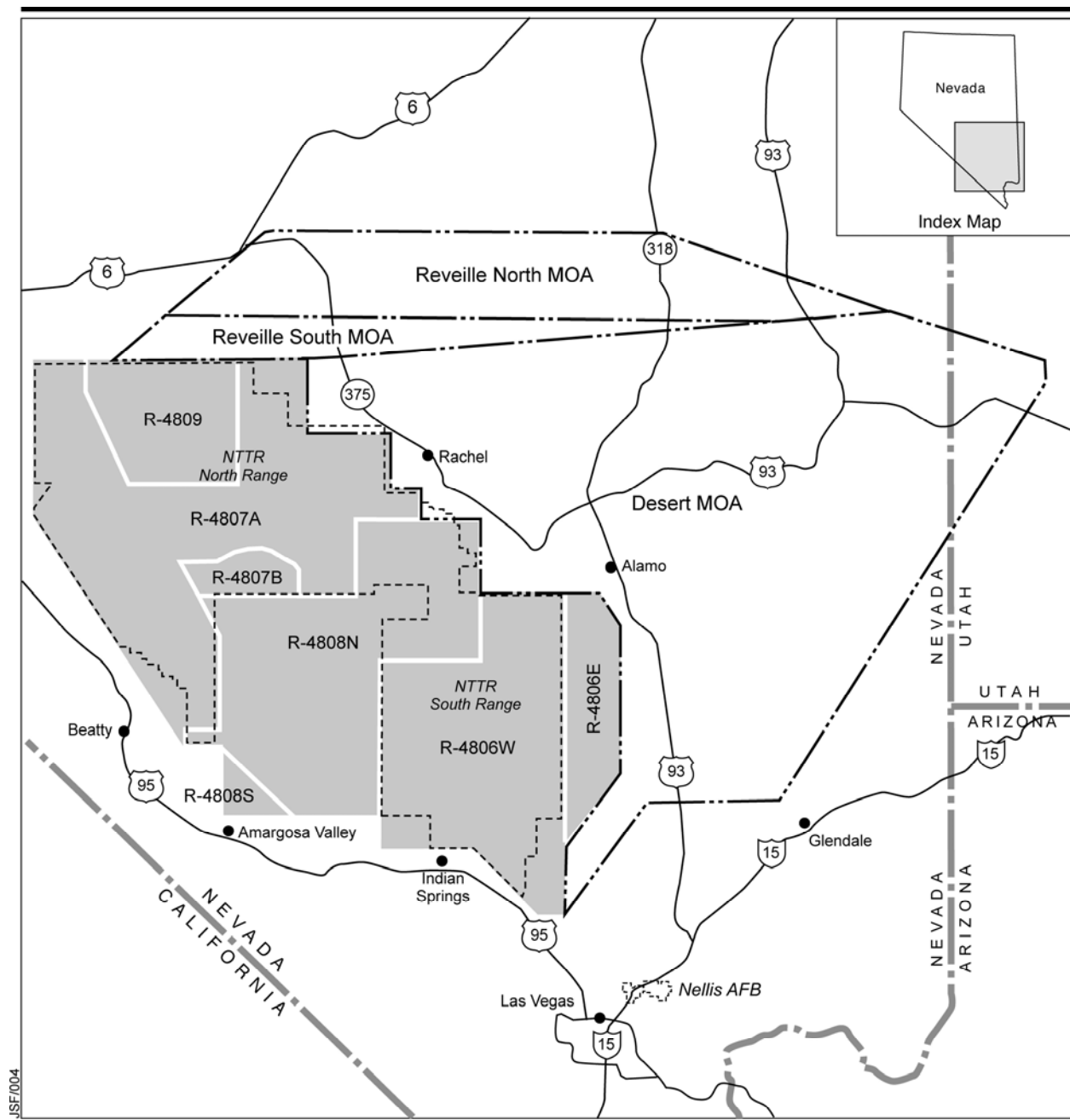
All IOT&E test flight activities would occur during daylight and would occur at a minimum of 12 nautical miles offshore. All F-35 aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the Sea Range airspace. No modifications to existing airspace would be made. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures.

**Deployment Demonstration.** The NAWCWD Point Mugu Ranges are currently identified as one of the preferred locations for deployment demonstration. Two shipboard deployment demonstrations would occur on the ranges. A discussion of deployment demonstration activities is provided in Section 2.2.2.3.

#### **2.2.3.5 Nevada Test and Training Range.**

JSF IOT&E activities proposed for NTTR include both pilot training and proficiency flights and test flights.

A total of approximately 970 F-35 sorties totaling 1,220 flight hours would occur at NTTR during the 2-year duration of JSF IOT&E. Approximately 54 percent of the total F-35 flight hours in NTTR would be training/proficiency flights. Total support aircraft flight hours would account for approximately 50 percent of the total IOT&E flight hours. Figure 2.2-4 shows the location of the NTTR. Table 2.2-10 provides a summary of the JSF IOT&E activities proposed for NTTR.



#### EXPLANATION

- |  |                       |  |                              |
|--|-----------------------|--|------------------------------|
|  | State Boundary        |  | MOA Military Operations Area |
|  | Restricted Airspace   |  | MOA Boundary                 |
|  | Military Installation |  |                              |
|  | U.S. Highway          |  |                              |
|  | Interstate Highway    |  |                              |
|  | State Highway         |  |                              |



#### Nevada Test and Training Range, Nevada and Utah

Figure 2.2-4

**Table 2.2-10. JSF IOT&E Flight Activities at NTTR**

	F-35		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours	Sorties	Flight Hours	Sorties	Flight Hours
Block 2						
Training/Proficiency	210	280	0	0	210	280
Test Flights	60	130	220	440	280	570
Total Block 2	270	410	220	440	490	850
Block 3						
Training/Proficiency	510	440	0	0	510	440
Test Flights	190	370	360	730	550	1,100
Total Block 3	700	810	360	730	1,060	1,540
IOT&E Total						
Training/Proficiency	720	720	0	0	720	720
Test Flights	250	500	580	1,170	830	1,670
Totals	970	1,220	580	1,170	1,550	2,390

**Pilot Training and Proficiency Flights.** All IOT&E F-35 pilot training and proficiency flights would originate and terminate at Edwards AFB. Approximately 720 total pilot training and proficiency sorties flying a total of approximately 720 flight hours would occur in NTTR airspace.

**Test Flights.** Test flight activities at NTTR would include support aircraft flights and captive carry weapon and weapon release missions. No ground activities would occur at NTTR. F-35 aircraft based at Edwards AFB would fly over the NTTR. F-35 aircraft would not land or take off at Nellis AFB or NTTR runways, except in an emergency situation.

A total of 250 F-35 sorties would be flown approximately 500 hours in NTTR airspace.

A total of approximately 580 support aircraft sorties flying 1,170 hours would occur at NTTR. The types of aircraft that may be used to support IOT&E activities in the NTTR include: fighters and attack, bombers, tankers, reconnaissance and surveillance, helicopters, and UAVs.

IOT&E flight test activities at NTTR include three missions that would include releases of inert weapons. Table 2.2-11 provides a summary of weapon missions at NTTR.

All F-35 and support aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the NTTR airspace. No modifications to existing airspace would be made. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures.



**Table 2.2-11. JSF IOT&E Weapons Missions at NTTR**

Block 2	
Air-to-Ground Weapon Releases	3
Aerial Target Launches & Air-to-Air Live Missile Shots	0
Block 3	
Air-to-Ground Weapon Releases	0
Aerial Target Launches & Air-to-Air Live Missile Shots	0
IOT&E Total	
Air-to-Ground Weapon Releases	3
Aerial Target Launches & Air-to-Air Live Missile Shots	0

### 2.2.3.6 Utah Test and Training Range.

JSF IOT&E activities proposed for UTTR include test flights. A total of approximately 770 F-35 sorties totaling approximately 1,520 flight hours would occur at UTTR during the 2-year duration of JSF IOT&E. Figure 2.2-5 shows the location of the UTTR. Table 2.2-12 provides a summary of the JSF IOT&E activities proposed for UTTR.

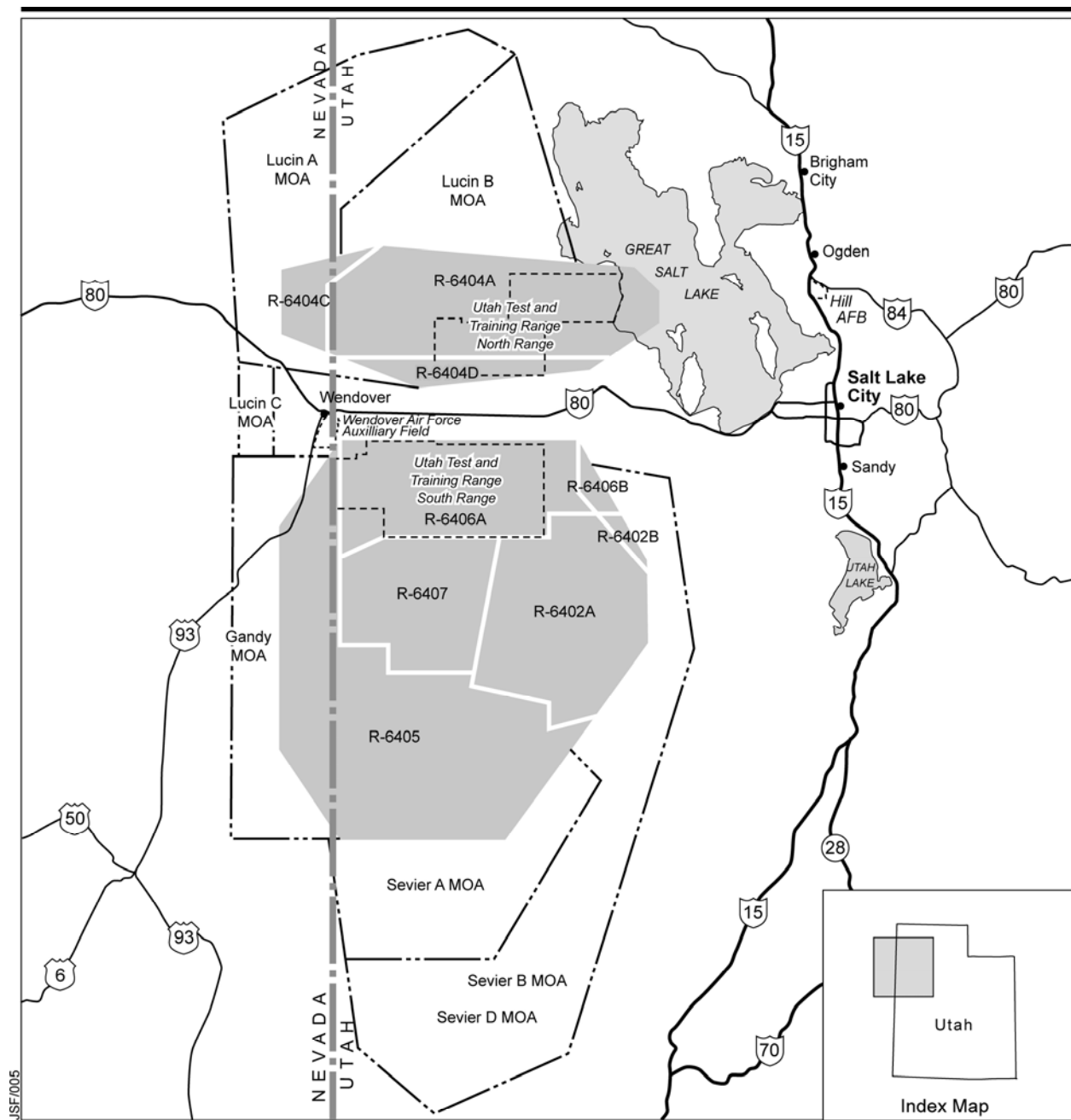
**Table 2.2-12. JSF IOT&E Flight Activities at UTTR**

	F-35		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours	Sorties	Flight Hours	Sorties	Flight Hours
Block 2						
Training/Proficiency	0	0	0	0	0	0
Test Flights	210	420	50	100	260	520
Total Block 2	210	420	50	100	260	520
Block 3						
Training/Proficiency	0	0	0	0	0	0
Test Flights	560	1,100	140	270	700	1,370
Total Block 3	560	1,100	140	270	700	1,370
IOT&E Total						
Training/Proficiency	0	0	0	0	0	0
Test Flights	770	1,520	190	370	960	1,890
Totals	770	1,520	190	370	960	1,890

Test flight activities at UTTR would include support aircraft flights and air-to-air missile tests. No ground activities would occur at UTTR. F-35 aircraft based at Edwards AFB would fly over the UTTR. F-35 aircraft would not land or take off at Hill AFB or UTTR runways, except in an emergency situation.

Support aircraft that would be used include tankers (KC-135 and KC-10) for aerial refueling of the F-35 aircraft. A total of approximately 190 support aircraft sorties flying 370 hours would occur at UTTR.

The aerial targets (drones) would be launched from and recovered at UTTR. Approximately five drones would be launched, and five air-to-air live missile shots would occur. Table 2.2-13 provides a summary of weapon missions at UTTR.



#### EXPLANATION

- State Boundary
- Restricted Airspace
- - - Military Installation
- 80 Interstate Highway
- MOA Military Operations Area
- MOA Boundary



#### Utah Test and Training Range, Utah and Nevada

Figure 2.2-5

**Table 2.2-13. JSF IOT&E Weapons Missions at UTTR**

Block 2	
Air-to-Ground Weapon Releases	0
Aerial Target Launches & Air-to-Air Live Missile Shots	2
Block 3	
Air-to-Ground Weapon Releases	0
Aerial Target Launches & Air-to-Air Live Missile Shots	3
IOT&E Total	
Air-to-Ground Weapon Releases	0
Aerial Target Launches & Air-to-Air Live Missile Shots	5

All F-35 and support aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the UTTR airspace. No modifications to existing airspace would be made. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures.

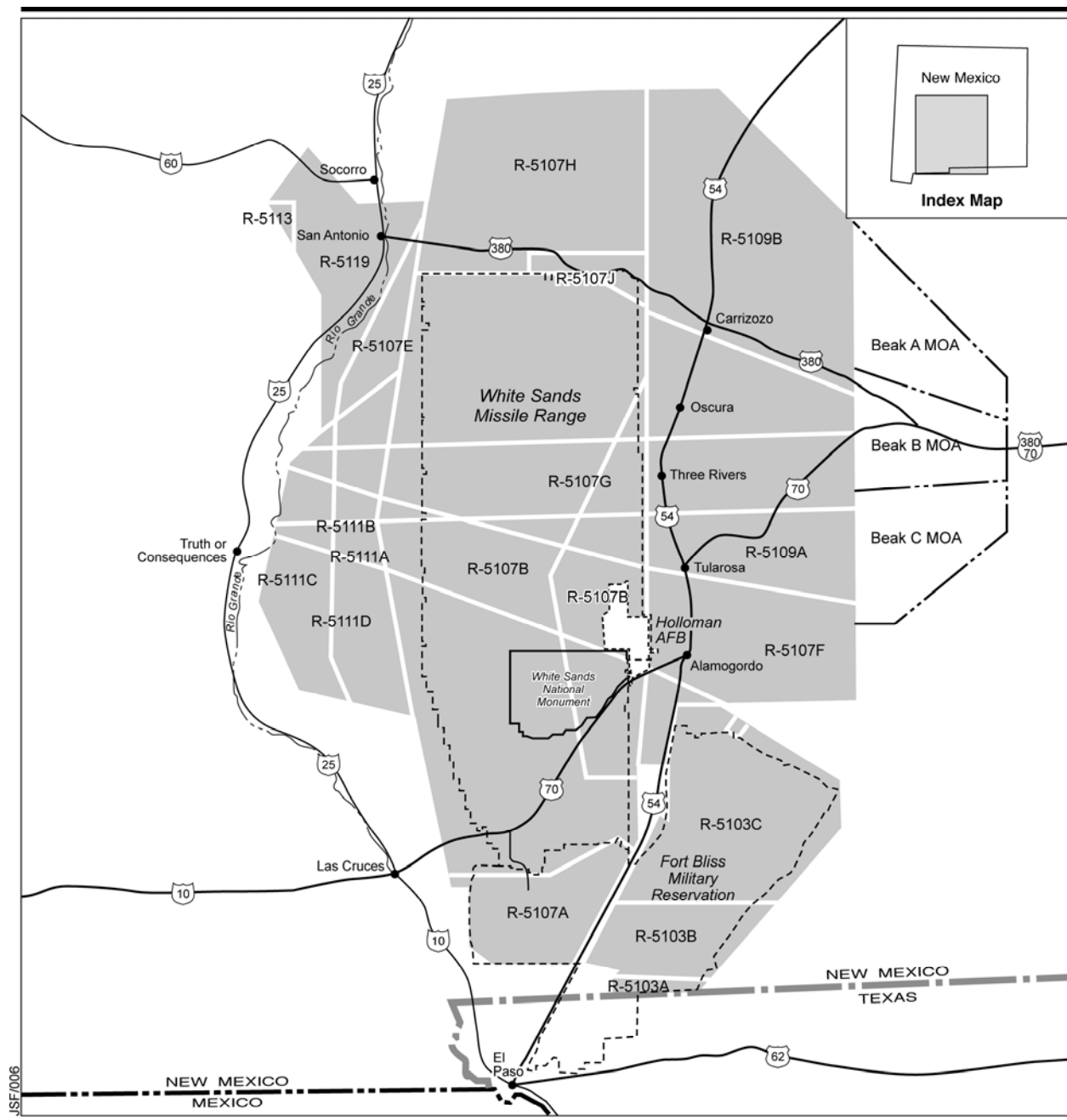
### **2.2.3.7 White Sands Missile Range.**

WSMR is proposed as an alternate location to UTTR for air-to-air missile tests. Figure 2.2-6 shows the location of WSMR. Table 2.2-14 provides a summary of the JSF IOT&E activities that may occur at WSMR.

**Table 2.2-14. JSF IOT&E Flight Activities at WSMR**

	F-35		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours	Sorties	Flight Hours	Sorties	Flight Hours
Block 2						
Training/Proficiency	0	0	0	0	0	0
Test Flights	10	20	2	4	12	24
Total Block 2	10	20	2	4	12	24
Block 3						
Training/Proficiency	0	0	0	0	0	0
Test Flights	10	20	3	6	13	26
Total Block 3	10	20	3	6	13	26
IOT&E Total						
Training/Proficiency	0	0	0	0	0	0
Test Flights	20	40	5	10	25	50
Totals	20	40	5	10	25	50

Flight tests at WSMR would include F-35 aircraft flights, support aircraft flights, aerial target launches, and air-to-air live missile shots. F-35 aircraft based at Edwards AFB would fly over the WSMR. F-35 aircraft would not land or take off at WSMR, except in an emergency situation. A total of approximately 20 F-35 sorties would be flown 40 hours. Support aircraft that would be used include KC-135 tankers for aerial refueling of the F-35 aircraft. Approximately 5 tanker sorties would fly a total of approximately 10 hours. The aerial targets (drones) would be launched from and recovered at WSMR. Approximately five drones



#### EXPLANATION

- — — State Boundary
- — — U.S. Border
- Restricted Airspace
- Military Installation
- 70 U.S. Highway
- 10 Interstate Highway

- MOA Military Operations Area
- — — MOA Boundary

0 7 14 28 Miles



### White Sands Missile Range, New Mexico

Figure 2.2-6

would be launched, and five air-to-air live missile shots would occur. Table 2.2-15 provides a summary of weapon missions at WSMR.

**Table 2.2-15. JSF IOT&E Weapons Missions at WSMR**

<b>Block 2</b>	
Air-to-Ground Weapon Releases	0
Aerial Target Launches & Air-to-Air Live Missile Shots	2
<b>Block 3</b>	
Air-to-Ground Weapon Releases	0
Aerial Target Launches & Air-to-Air Live Missile Shots	3
<b>IOT&amp;E Total</b>	
Air-to-Ground Weapon Releases	0
Aerial Target Launches & Air-to-Air Live Missile Shots	5

All F-35 aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the WSMR airspace. No modifications to existing airspace would be made. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures.

#### **2.2.3.8 National Training Center Fort Irwin.**

JSF IOT&E activities proposed for NTC Fort Irwin include test flights. A total of approximately 110 F-35 test flights for a total of 160 flying hours would occur in the NTC Fort Irwin airspace. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for NTC Fort Irwin test flights. Figure 2.2-2 shows the location of NTC Fort Irwin. Table 2.2-16 provides a summary of the JSF IOT&E activities proposed for NTC Fort Irwin.

**Table 2.2-16. JSF IOT&E Flight Activities at NTC Fort Irwin**

	<b>F-35</b>		<b>Support Aircraft</b>		<b>Total Aircraft</b>	
	<b>Sorties</b>	<b>Flight Hours</b>	<b>Sorties</b>	<b>Flight Hours</b>	<b>Sorties</b>	<b>Flight Hours</b>
Block 2						
Training/Proficiency	0	0	0	0	0	0
Test Flights	40	60	0	0	40	60
Total Block 2	40	60	0	0	40	60
Block 3						
Training/Proficiency	0	0	0	0	0	0
Test Flights	70	100	0	0	70	100
Total Block 3	70	100	0	0	70	100
IOT&E Total						
Training/Proficiency	0	0	0	0	0	0
Test Flights	110	160	0	0	110	160
Totals	110	160	0	0	110	160

These activities would use NTC Fort Irwin's restricted airspace areas R-2502 N and R-2502 E (see Figure 2.2-2). F-35 aircraft based at Edwards AFB would fly over the NTC Fort Irwin ranges. F-35 aircraft would not land or take off at NTC Fort Irwin runways, except in an emergency situation.

All F-35 aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the NTC Fort Irwin airspace. No modifications to existing airspace would be made.

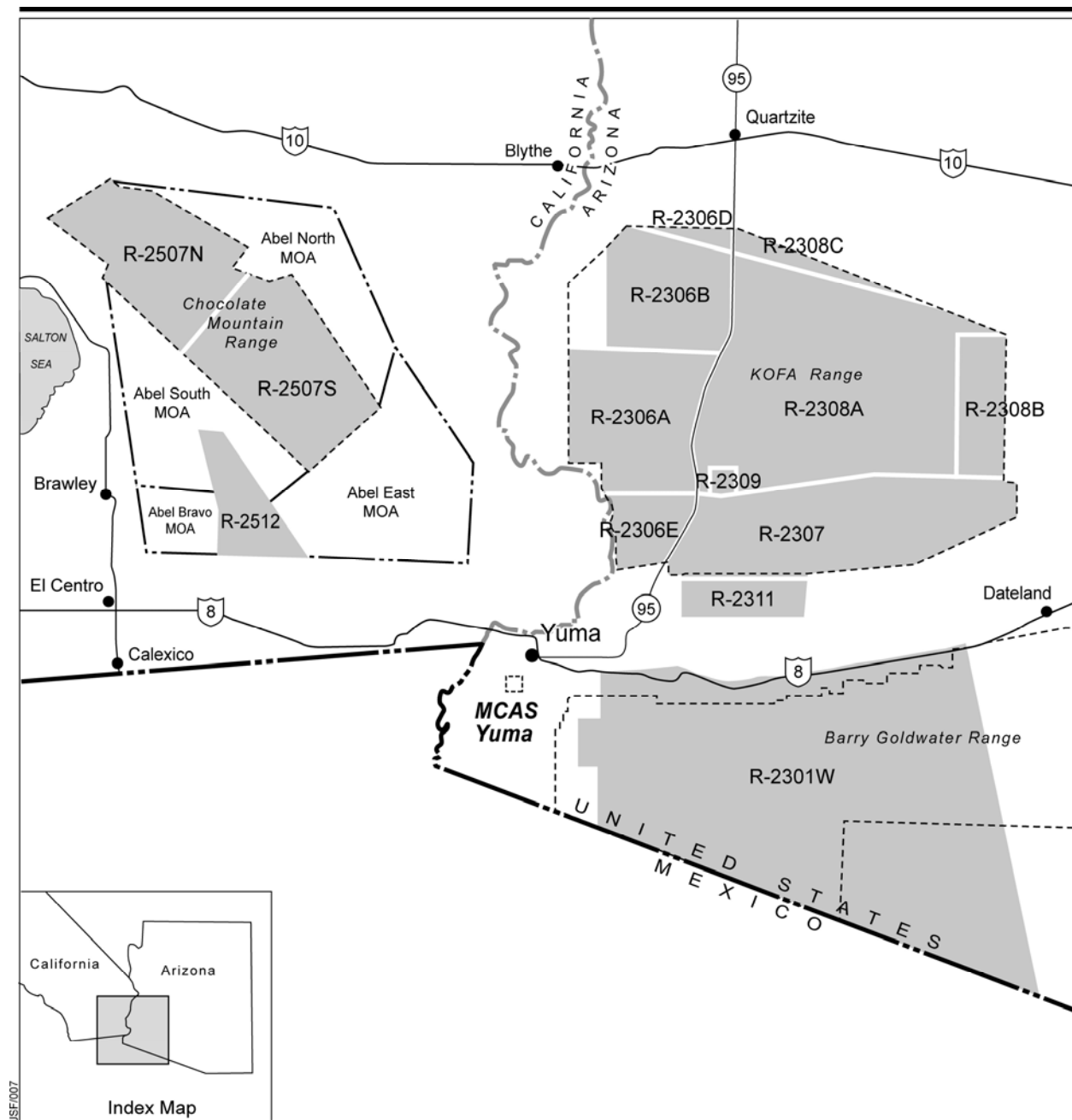
### **2.2.3.9 Marine Corps Air Station Yuma Ranges.**

JSF IOT&E activities proposed for the MCAS Yuma Ranges include test flights and a possible deployment demonstration. A total of approximately 860 F-35 sorties totaling 1,260 flight hours would occur at the MCAS Yuma Ranges during the 2-year duration of JSF IOT&E. No use of other aircraft has been identified as being required to support F-35 test flights in this area. Figure 2.2-7 shows the location of MCAS Yuma and its test ranges. Table 2.2-17 provides a summary of the JSF IOT&E activities proposed for MCAS Yuma Ranges.

**Table 2.2-17. JSF IOT&E Flight Activities at MCAS Yuma Ranges**

	F-35		Support Aircraft		Total Aircraft	
	Sorties	Flight Hours	Sorties	Flight Hours	Sorties	Flight Hours
Block 2						
Training/Proficiency	0	0	0	0	0	0
Test Flights	330	480	0	0	330	480
Total Block 2	330	480	0	0	330	480
Block 3						
Training/Proficiency	0	0	0	0	0	0
Test Flights	530	780	0	0	530	780
Total Block 3	530	780	0	0	530	780
IOT&E Total						
Training/Proficiency	0	0	0	0	0	0
Test Flights	860	1,260	0	0	860	1,260
Totals	860	1,260	0	0	860	1,260

**Test Flights.** Some of the flight test activities proposed for the R-2515 and R-2508 airspace areas discussed under Test Flights for the R-2508 Complex in Section 2.2.3.2 would occur in MCAS Yuma Ranges. The amount of test flight activity that would use MCAS Yuma Ranges has not been defined, but it would be a portion of the total of 860 F-35 sorties and 1,260 flying hours that have been identified as occurring in either the R-2508 Complex or MCAS Yuma Ranges. For the purposes of this analysis, it is assumed that this total could occur at either R-2508 Complex or MCAS Yuma Ranges. However, the actual numbers that would occur at either location would be less. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for MCAS Yuma Ranges test flights.



#### EXPLANATION

- |                       |                              |
|-----------------------|------------------------------|
| State Boundary        | MOA Military Operations Area |
| U.S. Border           | MOA Boundary                 |
| Restricted Airspace   |                              |
| Military Installation |                              |
| Interstate Highway    |                              |
| State Highway         |                              |



### Marine Corps Air Station Yuma and Ranges, Arizona and California

**Figure 2.2-7**

These activities would use MCAS Yuma Ranges that include the western portion of the Barry Goldwater Range and Kofa Range in Arizona and the Chocolate Mountain Range in California (see Figure 2.2-7). F-35 aircraft based at Edwards AFB would fly over the MCAS Yuma Ranges. During test flight activities, F-35 aircraft would not land or take off at MCAS Yuma runways, except in an emergency situation. However, MCAS Yuma is a potential location for a deployment demonstration location during which F-35 aircraft would use the runway (see below).

All F-35 aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the MCAS Yuma Ranges airspaces. No modifications to existing airspace would be made.

**Deployment Demonstration.** MCAS Yuma is currently identified as one of the preferred locations for deployment demonstration. A discussion of deployment demonstration activities is provided in Section 2.2.2.3.

## **2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY**

Locations other than those depicted in the Proposed Action were evaluated and eliminated from further study. The evaluation was based on the criteria presented in Section 1.2 of this EA/OEA. A more detailed discussion of the site selection process is provided in Appendix C.

The proposed JSF IOT&E program would occur at Edwards AFB and would be conducted at MRTFB locations in the western U.S. as described in the 2009 TEMP. Other MRTFB locations were considered but eliminated from further study. US Army Kwajalein Atoll, Pacific Missile Range Facility, and Atlantic Undersea Test and Evaluation Center were eliminated because they did not meet the criterion that the DOD Test Ranges should be located within the CONUS. The High Energy Laser Systems Test Facility, Dugway Proving Ground, Aberdeen Test Center, 45th Space Wing (Eastern Space and Missile Center) Cape Canaveral, 30th Space Wing (Western Space and Missile Center) Vandenberg AFB, Arnold Engineering Development Center (Aeronautical Systems Division), and Joint Interoperability Test Command were eliminated because they did not meet the criterion that the DOD Test Ranges should have flight test or aerial combat capabilities. Finally, Naval Air Test Center Patuxent River and the Air Armament Center were eliminated because they did not meet the criterion that the DOD Test Ranges should be located within the JSF combat radius of the MTF (Edwards AFB).

A number of locations were identified as potentially suitable for deployment demonstrations. Locations not meeting the selection criteria for deployment demonstration sites presented in Section 1.2 were eliminated from further consideration. The evaluation of suitable deployment demonstration sites began with assessing the Air Mobility Command's Airfield Suitability and Restrictions Report, September 2008, list of over 1,000 runways located in the CONUS. Based on the required criterion that all deployment demonstration sites should be located at U.S. military or joint use installations with suitable security, that list was reduced to 208 sites. The list was further reduced to 169 sites by focusing on



sites with runways 8,000 feet or longer. Using the criterion that states that the deployment demonstration sites should be installations that the services use for deployment readiness preparation reduced the list to 104 sites. The narrowing process then focused on sites capable of handling the C-17 and fighter type aircraft. The evaluation resulted in 100 sites being identified as suitable.

At that point, the evaluation focused on identifying preferred locations based on time-on-range or if the installation was a CRTIC. This criterion reduces potential sites from 100 to 36 sites. Further narrowing was accomplished by identifying representative FOLs, including service specific locations. For example, Alpena County Regional Airport, MI and Volk Field, WI have facilities specifically designed for DOD personnel to use as training sites prior to deployment into a combat area of operations. The list of 36 was further reduced to 8 preferred sites.

AFI 10-601 requires testing and evaluation to be conducted in as realistic an operational environment as possible to estimate the system's military utility, operational effectiveness, and operational suitability. Therefore alternatives based on computer and physical simulations for conducting IOT&E were eliminated as not meeting this requirement.

No reasonable alternatives to the Proposed Action were identified.

## **2.4 COMPARISON OF ENVIRONMENTAL IMPACTS**

This section presents a summarized comparative analysis of the No-Action Alternative and Proposed Action. Detailed discussions of the potential effects of the No-Action Alternative and Proposed Action are presented in Chapter 4.0, Environmental Consequences.

### **Air Quality**

No-Action Alternative. Under the No-Action Alternative, there would be no project-related air emissions. No significant air quality impacts are anticipated.

Proposed Action. Air emissions from F-35 IOT&E activities would be *de minimis* and not regionally significant, therefore, the Proposed Action would conform to the applicable SIP for nonattainment areas. No significant air quality impacts would be expected.

### **Noise**

No-Action Alternative. Under the No-Action Alternative, there would be no project-related noise. No significant impacts to the noise environment are anticipated.

Proposed Action. Noise levels at the Edwards AFB airfield would increase due to F-35 take-offs and landings during IOT&E. This increase in noise levels would not exceed the significance threshold established by the FAA. Noise produced by the F-35 is expected to be comparable to that from other jet fighters currently operating on the test ranges. The proposed deployment demonstrations would

slightly increase the overall frequency of aircraft flight noise events at each site, but with a barely perceptible noise increase in each flight event. No significant impacts to the noise environment would be expected.

### **Biological Resources**

No-Action Alternative. Under the No-Action Alternative, no significant impacts to biological resources would be expected.

Proposed Action. The Proposed Action would not present the potential for any impacts to vegetation. The proposed JSF IOT&E activities would be consistent with existing, ongoing activities at the test ranges. Wildlife on the ranges is expected to be acclimated to these routine activities. The increased noise from F-35 overflight is not expected to have a significant impact to biological resources.

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## 3.0 AFFECTED ENVIRONMENT

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This chapter provides a description of each location where JSF IOT&E activities would occur and then describes the existing environmental conditions at these locations. The environmental components addressed include relevant natural or human environments that are likely to be affected by the Proposed Action.

Based upon the nature of activities that would occur under the Proposed Action, it was determined that the potential exists for the following resources to be affected at these locations: air quality, noise, and biological resources. More detail is provided for locations that are analyzed in more detail. These locations are Edwards AFB, R-2508 Complex, NAWCWD China Lake, NAWCWD Point Mugu Ranges, NTTR, UTTR, NTC Fort Irwin, and MCAS Yuma.

### 3.1 DESCRIPTION OF LOCATIONS

#### 3.1.1 Edwards Air Force Base

Edwards AFB is located in the Antelope Valley region of the western Mojave Desert in Southern California, about 60 miles northeast of Los Angeles, California (see Figure 2.2-2). The base occupies an area of approximately 301,000 acres or 470 square miles and lies within Kern, Los Angeles, and San Bernardino counties.

The AFFTC, located at Edwards AFB, is typically used to conduct aircraft ground and flight tests. It is the Air Force Materiel Command's center of excellence for research, development, test, and evaluation of aerospace systems for the U.S. and its allies. Edwards AFB provides a myriad of aircraft testing capabilities that include, but are not limited to, propulsion, performance, fuel systems, human factors, reliability and maintainability, flutter, avionics integration, and all-weather/climate testing. Edwards AFB has (1) the required test equipment, (2) facilities expressly designed for flight test support, (3) laboratories, and (4) trained personnel necessary to conduct flight test operations.

#### 3.1.2 Test Ranges

Brief descriptions of the test range locations proposed for JSF IOT&E activities are provided in the following sections.

##### 3.1.2.1 R-2508 Complex.

The R-2508 Complex includes approximately 19,600 square miles of airspace in the Mojave Desert region of California and includes restricted areas R-2508, R-2502N, R-2502E, R-2505, R-2506, R-2524, and R-2515 and adjacent MOAs and ATCAAs which overlie portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties (see Figure 2.2-2). This R-2508 Complex encompasses airspace at Edwards AFB, NAWCWD China Lake, and NTC Fort Irwin. Management of military aircraft operations in the R-2508 Complex is

performed by the R-2508 Joint Policy and Planning Board, which consists of the Commanders at Edwards AFB, NAWCWD China Lake, and NTC Fort Irwin. JSF IOT&E test range activities that would occur in airspace at NAWCWD China Lake and NTC Fort Irwin are separate from those using remainder of the R-2508 Complex airspace, and the NAWCWD China Lake and NTC Fort Irwin airspaces are discussed separately. Therefore, use of the term R-2508 Complex in this EA/OEA refers to the area of the R-2508 Complex that excludes the airspace associated with NAWCWD China Lake (i.e., R-2505, R-2506, and R-2524) and NTC Fort Irwin (R-2502N and R-2502E).

### **3.1.2.2    *Naval Air Warfare Center Weapons Division China Lake.***

NAWCWD China Lake is located in the Mojave Desert of California, approximately 150 miles northeast of Los Angeles. It consists of two major land areas: the North Range, encompassing 606,926 acres, and the South Range, encompassing 503,510 acres. The North Range lies in Inyo, Kern, and San Bernardino counties and the South Range is located entirely within San Bernardino County. The South Range eastern perimeter borders NTC Fort Irwin.

NAWCWD China Lake serves as the Navy's research, development, test, and evaluation center of excellence for weapon systems associated with air warfare, aircraft weapons integration, missiles and their subsystems, and airborne electronic warfare systems. Expertise includes ordnance environmental and safety testing, ordnance warhead testing, radar cross-section measurement, high-speed track testing, parachute and ejection seat testing, and electronic warfare testing. NAWCWD China Lake's mission is to provide the warfighter with absolute combat power through technologies that deliver dominant combat effects and matchless capabilities by: (1) performing research, development, test, and evaluation, logistics, and in-service support for guided missiles, free fall weapons, targets, crew systems, and electronic warfare; (2) integrating weapons and avionics on tactical aircraft; (3) operating the Navy's western land and sea range test and evaluation complex; and (4) developing and applying new technology to ensure battle space dominance. Although NAWCWD lands are authorized for Navy use, they are also used by the other military services (Marine Corps, Air Force, and Army) and other government agencies including the Department of Energy and the National Aeronautics and Space Administration (NASA).

Restricted airspaces associated with NAWCWD China Lake that would be used during the JSF IOT&E are R-2505 overlying the North Range, R-2524 overlying the South Range, and R-2506 adjacent to the North Range (see Figure 2.2-2).

### **3.1.2.3    *Naval Air Warfare Center Weapons Division Point Mugu.***

NAWCWD Point Mugu is located approximately 50 miles northwest of Los Angeles, California, in southern Ventura County. NAWCWD Point Mugu controls 36,000 square miles of Special Use Airspace over the Pacific Ocean as the Point Mugu Sea Range. The deep ocean area and controlled airspace associated with the sea range parallels the California coastline for about 200 miles and extends seaward for more than 180 miles (see Figure 2.2-3). The main station at Point

Mugu consists of 4,490 acres on the Pacific Coast. The Point Mugu Sea Range encompasses Anacapa and San Nicolas Islands, which are part of Ventura County, and Santa Rosa, San Miguel, and Santa Cruz Island, which are part of Santa Barbara County.

NAWCWD activities at Point Mugu are test and evaluation of weapons systems, providing the U.S. and allied forces modeling and simulation capabilities and an area to perform actual operations and missile firings. The NAWCWD Point Mugu Sea Range is primarily used to test guided missiles and other weapons systems, as well as the ships and aircraft that serve as platforms for launching weapons/ordnance.

#### **3.1.2.4 Nevada Test and Training Range.**

NTTR is located in southern Nevada in Clark, Lincoln, and Nye counties. It covers 3.1 million acres (approximately 4,800 square miles) and encompasses 12,000 square miles of airspace. Associated MOAs extend into Iron and Washington Counties, Utah (see Figure 2.2-4). NTTR is comprised of airspace, land, and infrastructure designated for military uses. The withdrawn lands of Nellis Air Force Range (NAFR) are used for national testing and training for military equipment and personnel. The airspace of the NTTR is comprised of seven restricted areas and two MOAs. The infrastructure includes airfields and simulated targets and threats throughout NAFR. Approximately 163 tactical target complexes containing more than 1,300 targets are included in the NAFR. These target complexes provide a realistic arena for operational training and testing of weapon systems, tactics, and combat readiness. The NAFR is divided into two functional areas, which both accommodate live and inert ordnance: the North Range and the South Range.

#### **3.1.2.5 Utah Test and Training Range.**

UTTR is located in Box Elder and Tooele Counties in northwestern Utah, approximately 50 miles west of Hill AFB. Associated airspace areas extend into Juab and Millard counties, Utah, and Elko and White Pine counties, Nevada (see Figure 2.2-5). UTTR airspace consists of 10 restricted airspace units, 8 MOAs, and 2 Air Traffic Control Assigned Airspaces linked together to form a cohesive complex overlying 16,652 square miles in Utah and Nevada (U.S. Air Force Air Combat Command, 2008b).

For land-based activities, the north range of UTTR (UTTR-North) consists of 369,014 acres of land (approximately 577 square miles), which the U.S. Air Force controls in its entirety. The area of the south range of UTTR (UTTR-South) controlled by the U.S. Air Force is 587,899 acres (approximately 919 square miles) (Department of the Air Force, 2008).

Activities at UTTR currently include, but are not limited to: practice bombing and gunnery used by military aircraft, tests of new weapons or modifications to existing weapon systems, propagation testing, rocket motor test firing and dissection, rocket motor and munitions storage, small arms and machine-gun training, on-site treatment of hazardous waste explosives and military

propellants, range cleanup and remediation measures, and support functions for the preceding activities (Department of the Air Force, 2008).

#### **3.1.2.6 White Sands Missile Range.**

WSMR is a DOD major range and test facility that covers approximately 3,200 square miles in south-central New Mexico in Dona Ana, Lincoln, Otero, Sierra, and Socorro counties (see Figure 2.2-6). This range is approximately 40 miles wide by 100 miles long, with other areas available for those tests requiring additional flight space and/or safety zones. It is surrounded by the communities of El Paso (40 miles south), Las Cruces (25 miles west), and Alamogordo (50 miles northeast). WSMR is part of the Developmental Test Command, which reports to the U.S. Army Test and Evaluation Command. The range possesses extensive capabilities and infrastructure, as well as unique characteristics used by the U.S. Army, U.S. Navy, U.S. Air Force, NASA, other Federal agencies, universities, private industry, and some foreign militaries (Joint Strike Fighter Program Office, 2007).

A total of 13 designated restricted airspace areas are controlled by WSMR and scheduled for research, development, testing and experimentation, military training, and civilian contract programs. Eighteen areas are charted as restricted airspace by the FAA, which allows these areas to be used for hazardous activities (live ordnance delivery, missile firings, laser shots, etc). Large areas of the airspace are used as safety buffer zones for missile and rocket firings (Joint Strike Fighter Program Office, 2007).

The primary mission of WSMR includes the conduct of range instrumentation research and development; development tests of U.S. Army, U.S. Navy, and U.S. Air Force air-to-air/surface and surface-to-air/surface weapons systems; dispenser and bomb drop programs; gun system testing; target systems; meteorological and upper atmospheric probes; equipment, component, and subsystem programs; high-energy laser programs; and special tasks. In addition to testing U.S. Army, U.S. Navy, and U.S. Air Force systems, WSMR develops and tests target drones and manned flight vehicles; develops and tests propulsion, guidance, support, and instrumentation systems; and evaluates the effects of environmental conditions (e.g., weather) on system performance (Joint Strike Fighter Program Office, 2007).

#### **3.1.2.7 National Training Center Fort Irwin.**

NTC Fort Irwin is located in San Bernardino County, California, approximately 37 miles northeast of Barstow in the Mojave Desert and covers more than 1,000 square miles (see Figure 2.2-2). The NTC mission is to provide challenging, realistic, combined arms training under conditions that our military is likely to face in actual combat. The NTC conducts training with the Army Reserve, National Guard, joint services, special operations forces, other federal agencies, and foreign military services. Up to 75,000 personnel train at the NTC annually (Calibre, 2006).

Airspace associated with NTC Fort Irwin includes restricted areas R-2502N and R-2502E (see Figure 2.2-2). This airspace is used primarily for joint service live-fire and combat support training. Most of the flight activity in R-2502N and R-2502E is helicopters, the majority of which train at Fort Irwin prior to global deployments. The primary fixed-wing users are Air Force Air Warrior aircraft flown in support of NTC combat training operations. Unmanned aircraft system operations are conducted by visiting military and other federal agencies (Calibre, 2006).

### **3.1.2.8 Marine Corps Air Station Yuma.**

MCAS Yuma is located southeast of Yuma, Arizona (see Figure 2.2-7). It is one of the Marine Corps' premier aviation training bases. With access to 2.8 million acres of bombing and aviation training ranges and superb flying weather, MCAS Yuma supports 80 percent of the Marine Corps' air-to-ground aviation training. Each year, the air station hosts numerous units and aircraft from U.S. and NATO forces (Global Security.org, 2008b).

MCAS Yuma manages the Bob Stump Training Range Complex encompassing approximately 2.8 million acres in the Barry Goldwater and Kofa ranges in southwest Arizona and the Chocolate Mountains Range in southeast California (see Figure 2.2-7).

### **3.1.3 Deployment Demonstration Locations**

The preferred locations for deployment demonstrations are Alpena CRTC, Edwards AFB, Eglin AFB, MCAGCC Twentynine Palms, MCAS Yuma, NAS Lemoore, NAWCWD Point Mugu Ranges, and Volk Field ANGB. A list of other locations capable of supporting a deployment demonstration is provided in Appendix C. Edwards AFB, NAWCWD Point Mugu, and MCAS Yuma Ranges are described in Sections 3.1.1, 3.1.2.3, and 3.1.2.8, respectively. Brief descriptions of the other preferred deployment demonstration locations are provided in the following sections.

#### **3.1.3.1 Alpena Combat Range Test Center.**

The Alpena CRTC is an Air National Guard facility located at the Alpena County Regional Airport, a county owned and operated facility. It is located 6 miles west of the City of Alpena, Michigan, which is located on the northwestern shoreline of Lake Huron at the mouth of Thunder Bay.

The CRTC provides an integrated, year-round, realistic training environment (airspace, facilities, and equipment) that enables military units to enhance their combat capability and readiness at a deployed, combat oriented operating base (Michigan Air National Guard, 2002).

Alpena CRTC has the capacity to accommodate more than 1,000 people (Global Security.org, 2008a). The current employment at the installation is approximately 90 military and 25 civilian full time, 25 military part time (traditional guard), and 75 civilian part time.



### **3.1.3.2 Eglin Air Force Base.**

Eglin AFB, located in the northwest Florida panhandle, is one of 19 component installations that make up the MRTFB. Eglin AFB is situated among three counties: Santa Rosa, Okaloosa, and Walton. Eglin AFB's primary function is to support research, development, test, and evaluation of conventional weapons and electronic systems. It also provides support for individual and joint training of operational units.

The Eglin Military Complex occupies much of northwestern Florida, east of Pensacola. It comprises 724 square miles of land area, often referred to as the Eglin Reservation, and nearly 130,000 square miles of airspace overlying the land and water ranges. Approximately 2.5 percent of the airspace is over land and the remaining 97.5 percent is over water.

Eglin Main Base occupies 10,500 acres along the south central edge of the Eglin Reservation. Eglin Main Base includes an airfield with 2 major runways, one 12,000 feet and the other 10,000 feet long. Duke Field encompasses approximately 2,700 acres in the north central portion of Eglin AFB. Duke Field includes an 8,000-foot runway (U.S. Air Force, 2008).

### **3.1.3.3 Marine Corps Air Ground Combat Center Twentynine Palms.**

MCAGCC is located in the Mojave Desert in San Bernardino County, California, approximately 150 miles east of Los Angeles and 50 miles northeast of Palm Springs. The southern boundary of the installation is adjacent to the City of Twentynine Palms.

MCAGCC is the Marine Corps' largest live-fire training facility, encompassing 598,178 acres and comprising 23 different training areas. The majority of the installation is undeveloped and devoted to combined arms and live-fire training activities. Mainside, a training area located in the southernmost portion of the base, is the primary developed area, providing an array of maintenance, storage, administration, and housing facilities.

As of July 2007, the installation supported 11,546 military members and 1,710 civilian employees, plus an additional 8,047 military family members. Approximately 4,220 military personnel and their families live off the installation as do all civilian employees. The remaining military and military family personnel live on the installation (Department of the Navy, 2007).

### **3.1.3.4 Naval Air Station Lemoore.**

NAS Lemoore is located in Fresno and Kings Counties in the San Joaquin Valley of California, approximately 35 miles south of Fresno. NAS Lemoore is one of four Navy master jet bases in the United States, and is the home port for all active-duty, light-attack aircraft squadrons assigned to the Pacific Fleet. It occupies 18,784 acres and controls an additional 10,020 acres in air space. The airfield consists of two offset parallel runways, each 13,500 feet by 200 feet, with

a separation of 4,600 feet. In 2005, aircraft operations at NAS Lemoore totaled 161,000.

NAS Lemoore is the largest employer in Kings County, providing work for over 1,200 civilians and about 5,000 military personnel. The 2006 estimated daytime population at NAS Lemoore is 11,286 and 8,100 at night (Kings County Association of Governments, 2007).

### **3.1.3.5 Volk Field Air National Guard Base.**

Volk Field ANGB is a joint facility with the Wisconsin Air National Guard supporting the CRTC and the 128th Air Control Squadron. More than 200 units from the Army and Air National Guard, Air Force and Air Force Reserves, the Marine Corps and Naval Reserves use the Air National Guard CRTC at Volk Field ANGB each year. Other users include federal, state and local law enforcement agencies, Civil Air Patrol and youth organizations.

The mission of the CRTC is to provide a year-round training environment for ANG units to enhance their combat readiness. Volk Field is owned by the Wisconsin Department of Military Affairs and is leased to the U.S. Air Force and licensed to the ANG. It consists of 2,336 acres near the Village of Camp Douglas. The single runway can accommodate all military aircraft (Volk Field Air National Guard Base, 2005).

## **3.2 AIR QUALITY**

### **National Ambient Air Quality Standards**

Air quality in any given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The significance of a pollutant concentration is determined by comparing it to federal and/or state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that can occur while still protecting public health and welfare with a reasonable margin of safety.

The U.S. Environmental Protection Agency (EPA), under the requirements of the CAA, as amended in 1977 and 1990, has established NAAQS for six contaminants, referred to as criteria pollutants (40 CFR 50). These pollutants are carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter diameter equal to or less than 10 microns (PM<sub>10</sub>), particulate matter diameter equal to or less than 2.5 microns (PM<sub>2.5</sub>), lead (Pb), and sulfur dioxide (SO<sub>2</sub>). The NAAQS are defined as the maximum acceptable ground-level concentrations over applicable averaging periods for an individual criteria pollutant. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. The ozone precursors are nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs). The NAAQS are shown in Table 3.2-1.

**Table 3.2-1. National and California Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards	National Standards <sup>(a)</sup>	
			Primary <sup>(b, c)</sup>	Secondary <sup>(b, d)</sup>
Ozone	1-hour	0.09 ppm (180 µg/m <sup>3</sup> )		Same as primary
	8-hour	---	0.075 ppm (147 µg/m <sup>3</sup> )	---
Carbon monoxide	8-hour <sup>(e)</sup>	9 ppm (10 mg/m <sup>3</sup> )	9 ppm (10 mg/m <sup>3</sup> )	None
	1-hour	20 ppm (23 mg/m <sup>3</sup> )	35 ppm (40 mg/m <sup>3</sup> )	
Nitrogen dioxide	Annual	0.030 ppm (56 mg/m <sup>3</sup> )	0.053 ppm (100 µg/m <sup>3</sup> )	Same as primary
	1-hour	0.18 ppm (338 µg/m <sup>3</sup> )	---	
Sulfur dioxide	Annual	---	0.030 ppm (80 µg/m <sup>3</sup> )	---
	24-hour	0.04 ppm (105 µg/m <sup>3</sup> )	0.14 ppm (365 µg/m <sup>3</sup> )	---
	3-hour	---	---	0.5 ppm (1,300 µg/m <sup>3</sup> )
	1-hour	0.25 ppm (655 µg/m <sup>3</sup> )	---	---
PM <sub>10</sub>	Annual (arithmetic mean)	20 µg/m <sup>3</sup>		
	24-hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	Same as primary
PM <sub>2.5</sub>	Annual arithmetic	12 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	Same as primary
	24-hour	---	35 µg/m <sup>3</sup>	Same as primary
Lead	Calendar quarter	---	1.5 µg/m <sup>3</sup>	Same as primary
	30-day average	1.5 µg/m <sup>3</sup>	---	---

- Notes: (a) Other than for ozone, PM<sub>10</sub> and PM<sub>2.5</sub> and those based upon annual averages, standards are not to be exceeded more than once per year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years is equal to or less than the standard. PM<sub>10</sub> should not to be exceeded more than once per year on average over 3 years. PM<sub>2.5</sub> 24-hour standard is attained when the annual highest 98th percentile of 24-hour concentration over 3 years is below 35 µg/m<sup>3</sup>.
- (b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parentheses.
- (c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.
- (d) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the EPA approves the implementation plan.
- EPA = Environmental Protection Agency  
 µg/m<sup>3</sup> = micrograms per cubic meter  
 mg/m<sup>3</sup> = milligrams per cubic meter  
 PM<sub>2.5</sub> = particulate matter equal to or less than 2.5 microns in diameter  
 PM<sub>10</sub> = particulate matter equal to or less than 10 microns in diameter  
 ppm = parts per million

The California Air Resources Board (CARB) established state standards termed the California Ambient Air Quality Standards (CAAQS) (Table 3.2-1) for these same criteria pollutants. The CAAQS are as restrictive as the NAAQS, but also include pollutants (visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride) for which there are no national standards. The other states in which the Proposed Action would occur, Arizona, Florida, Michigan, Nevada,

Utah, New Mexico, and Wisconsin, have adopted the NAAQS for their air quality standards.

### **Existing Air Quality Conditions**

The region of influence (ROI) for air quality consists of the counties or air basins where each base or test range is located. Air basins are used in California. California is divided into 15 air basins to better manage air pollution in the state. Air basin boundaries were created by grouping areas with similar geographic and meteorological conditions. The existing air quality conditions are determined by the NAAQS attainment status for each ROI. The U.S. EPA designates all areas of the U.S. as having air quality better than (attainment) or worse than (non-attainment) the NAAQS. Pollutants in an area may be designated as unclassified when there are insufficient ambient air quality data for the U.S. EPA to form a basis for an attainment status. The non-attainment classifications for CO and PM<sub>10</sub> are further divided into moderate and serious categories. Ozone non-attainment is divided into marginal, moderate, serious, severe, and extreme categories.

Edwards AFB, the test ranges, and all deployment demonstration site locations are in attainment for CO, NO<sub>2</sub>, SO<sub>2</sub> and lead. The attainment status for the remaining criteria pollutants are listed for each location in Table 3.2-2. For bases or test ranges that encompass more than one county or air basin that are in nonattainment, the most stringent nonattainment status was assumed to be applicable. Since the deployment at NAWCWD Point Mugu Ranges would occur off-shore on aircraft carriers located greater than 12 nautical miles from shoreline, the air quality conditions around this particular off-shore site are not applicable.

### **Clean Air Act Conformity**

In those areas where the NAAQS are exceeded, the preparation of an SIP detailing how the state would attain the standard within mandated time frames is required. Section 176(c) of the CAA instructs a federal agency to deny support for or implementing any federal action unless the federal agency can determine that the activity will conform to the SIP's purpose of attaining and maintaining the NAAQS (Table 3.2-1).

The CAA, amended in 1990, expands the scope and content of the CAA's conformity provisions as they pertain to a SIP. Under Section 176(c) of the CAA, a project is in "conformity" if it corresponds to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. Conformity further requires that such activities would not:

- (1) Cause or contribute to any new violations of any air quality standards in any area;
- (2) Increase the frequency or severity of any existing violation of air quality standards in any area; or

**Table 3.2-2. NAAQS Attainment Status for Proposed JSF IOT&E Locations**

Installation	Location	Air Basin/Area	NAAQS Status		
			O <sub>3</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Edwards AFB	Kern, Los Angeles, San Bernardino Cos, CA	Mojave Desert,	N	N	A
<b>Test Ranges</b>					
R-2508 Complex	Fresno, Inyo, Kern, Los Angeles, San Bernardino, Tulare Cos, CA	Mojave Desert, Great Basin Valleys, San Joaquin Valley	N	N(serious)	A
NAWCWD China Lake	Inyo, Kern, San Bernardino Cos, CA	Mojave Desert, Great Basin Valleys	N	N(serious)	A
NTTR	Clark, Lincoln, Nye Cos, NV; Iron, Washington Cos, UT	N/A	A	A	A
UTTR	Box Elder, Juab, Millard, Tooele Cos, UT; Elko, White Pine Cos, NV	N/A	A	A	A
WSMR	Dona Ana, Lincoln, Otero, Sierra, Socorro Cos, NM	N/A	A	A	A
NTC Fort Irwin	San Bernardino Co, CA	Mojave Desert	N	N	A
MCAS Yuma Ranges	Imperial, Riverside Cos, CA	Salton Sea	N	N	A
	La Paz, Yuma Cos, AZ	Yuma Planning Area <sup>(1)</sup>	A	N	A
<b>Deployment Demonstration Locations</b>					
Alpena CRTC	Alpena Co, MI	N/A	A	A	A
Eglin AFB	Okaloosa Co, FL	N/A	A	A	A
MCAGCC Twentynine Palms	San Bernardino Co, CA	Mojave Desert	N	N	A
MCAS Yuma	Yuma Co, AZ	Yuma Planning Area	A	N	A
NAS Lemoore	Fresno, Kings Cos, CA	San Joaquin Valley	N(serious)	A	N
Volk Field ANGB	Juneau Co, WI	N/A	A	A	A

Note: <sup>(1)</sup> A portion of the Barry Goldwater Range is located within the PM<sub>10</sub> nonattainment portion of Yuma County. The remainder of the MCAS Yuma Ranges in AZ are in attainment areas.

A = Attainment

N = Nonattainment either moderate or basic (unless otherwise noted)

(3) Delay timely attainment of any air quality standard or any required interim emission reductions or other milestones in any area.

The U.S. EPA published final rules on general conformity (40 CFR Parts 51 and 93 in the Federal Register on November 30, 1993) that apply to federal actions in areas designated nonattainment for any of the criteria pollutants under the CAA. These rules specify *de minimis* emission levels by pollutant (Table 3.2-3) to determine the applicability of conformity requirements for a project. As defined in the general conformity rule, a formal conformity determination is required when the annual net total of direct and indirect emissions from a federal action, occurring in a nonattainment or maintenance area, equals or exceeds the annual *de minimis* levels for criteria pollutants.

**Table 3.2-3. De Minimis Thresholds in Nonattainment Areas**

<b>Pollutant</b>	<b>Degree of Nonattainment</b>	<b><i>De minimis</i> Level (tons/year)</b>
Ozone (VOCs and NO <sub>x</sub> )	Serious	50
	Severe	25
	Extreme	10
	Marginal and Moderate (outside an ozone transport region)	100
	Marginal and Moderate (outside an ozone transport region)	50
CO	All	100
PM <sub>10</sub>	Moderate	100
	Serious	70
PM <sub>2.5</sub>	Nonattainment	100
SO <sub>2</sub> or NO <sub>2</sub>	All	100
Lead	All	25

CO	=	carbon monoxide
NO <sub>2</sub>	=	nitrogen dioxide
NO <sub>x</sub>	=	nitrogen oxides
SO <sub>2</sub>	=	sulfur dioxide
PM <sub>2.5</sub>	=	particulate matter equal to or less than 2.5 microns in diameter
PM <sub>10</sub>	=	particulate matter equal to or less than 10 microns in diameter
VOC	=	volatile organic compound

In addition to meeting *de minimis* requirements, a federal action must not be considered a regionally significant action. A federal action is considered regionally significant when the total emissions from the action equal or exceed 10 percent of the air quality control area's emissions inventory for any criteria pollutant. The applicable region- or county-specific emissions inventories that are subject to general conformity regional significance comparisons are summarized in Table 3.2-4.

If a federal action meets *de minimis* requirements and is not considered a regionally significant action, it is exempt from further conformity analyses pursuant to 40 CFR Part 93.153. However, if modifications to the proposed action occur in the future, or if attainment counties are reclassified based on the new NAAQS or monitoring data, a revision to the conformity analysis may be required for those areas.

### **Stationary and Mobile Source Emissions**

The U.S. EPA oversees programs for stationary source operating permits (Title V), and for new or modified major stationary source construction and operation. Because no major stationary sources or major source modifications are associated with the JSF IOT&E, both Prevention of Significant Deterioration review and nonattainment pollutant New Source Review programs do not apply.

The only stationary source that would be associated with the JSF IOT&E is the aircraft maintenance engine test cell at Edwards AFB, which is typically considered a minor stationary source.

However, the mobile source emissions such as those from F-35 aircraft flight operations and associated aircraft GSE emissions are analyzed in this EA/OEA.

**Table 3.2-4. Emission Inventories for Applicable Nonattainment Regions**

Installation	Location	Air Basin/Area	NOx	Regional Emission Inventory (tons per year) <sup>(1)</sup>		
				VOC	PM <sub>10</sub>	PM <sub>2.5</sub>
Edwards AFB	Kern, Los Angeles, San Bernardino Cos, CA	Mojave Desert	91,247	33,215	73,913	N/A
<b>Test Ranges</b>						
R-2508 Complex	Fresno, Inyo, Kern, Los Angeles, San Bernardino, Tulare Cos, CA	Mojave Desert, Great Basin Valleys, San Joaquin Valley	285,175	168,338	213,781	N/A
NAWCWD China Lake	Inyo, Kern, San Bernardino Cos, CA	Mojave Desert, Great Basin Valleys	94,024	36,646	103,587	N/A
NTC Fort Irwin	San Bernardino Co, CA	Mojave Desert	91,247	33,215	73,913	N/A
MCAS Yuma Ranges	Imperial, Riverside Cos, CA	Salton Sea	12,702	10,987	85,155	N/A
	La Paz, Yuma Cos, AZ	Yuma Planning Area <sup>(3)</sup>	N/A	N/A	68,901 <sup>(2)</sup>	N/A
<b>Deployment Demonstration Locations</b>						
MCAGCC Twentynine Palms	San Bernardino Co, CA	Mojave Desert	91,247	33,215	73,913	N/A
MCAS Yuma	Yuma Co, AZ	Yuma Planning Area	N/A	N/A	68,901 <sup>(2)</sup>	N/A
NAS Lemoore	Fresno, Kings Cos, CA	San Joaquin Valley	191,151	131,692	N/A	38,070

Notes: <sup>(1)</sup> All data for California locations obtained from the <http://www.arb.ca.gov/app/emssumcat.php> 2010 predictions.

<sup>(2)</sup> Arizona Department of Environmental Quality, August 11, 2006, Final Yuma Maintenance Plan.

<sup>(3)</sup> A portion of the Barry Goldwater Range is located within the PM<sub>10</sub> nonattainment portion of Yuma County. The remainder of the MCAS Yuma Ranges in AZ are in attainment areas.

N/A = not applicable for general conformity applicability analysis

### Greenhouse Gas Emissions

Greenhouse gases (GHGs) are compounds found naturally within the Earth's atmosphere. These compounds trap and convert sunlight into infrared heat. In this way, greenhouse gases act as insulation, and contribute to the maintenance of global temperatures. As the levels of greenhouse gases increase, the result is a greater overall temperature on Earth. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe. However, the potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, the impact of proposed GHG emissions to climate change is discussed in the context of cumulative impacts to the total amount of GHG emissions resulting from the U.S. as discussed in Chapter 4. Appendix B presents estimates of GHG emissions generated by the proposed action.

The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). The primary greenhouse gas emitted by human activities in the U.S. was CO<sub>2</sub>, representing approximately 85 percent of total GHG emissions. The largest source of CO<sub>2</sub>, and of overall greenhouse gas emissions, was fossil fuel combustion. CH<sub>4</sub> emissions, which have declined from 1990 levels, resulted primarily from enteric fermentation associated with domestic livestock, decomposition of wastes in landfills, and natural gas systems. Agricultural soil management and mobile source fuel combustion were the major sources of N<sub>2</sub>O emissions. Because CO<sub>2</sub> emissions comprise approximately 85 percent of greenhouse gases and CO<sub>2</sub> emissions factors are the most readily available for some stationary and mobile sources including F-35, this EA/OEA considers CO<sub>2</sub> the representative greenhouse gas emission.

### **3.3 NOISE**

This section addresses noise levels at and near Edwards AFB and other deployment demonstration sites. Noise in the area around each site is predominantly caused by aircraft operations. Other sources of noise are comparatively negligible and are therefore not considered here.

#### **Noise Fundamentals and Methodology**

Noise can be described as unwanted sound. While most people conduct their daily lives in an environment full of sounds, some or all of these sounds can be considered generally undesirable and may detract from the quality of the human environment. A number of factors affect sound as it is perceived by the human ear. These factors include the actual level of the sound, the frequencies involved, the period of exposure, and changes or fluctuations in sound levels during exposure.

Noise levels are measured in units called decibels (dB). Because the human ear cannot perceive all pitches or frequencies equally well, noise measures are adjusted to compensate for the human lack of sensitivity to low-pitched and high-pitched sounds. This adjusted unit is known as the A-weighted decibel (dBA). The A-weighted network de-emphasizes both very low- and very high-pitched sounds, so that measured levels better correlate with human perception.

The human response to changes in noise levels depends on a number of factors, including the quality of the sound, the magnitude of the changes, the time of day at which the changes take place, whether the noise is continuous or intermittent, and an individual's ability to perceive the changes. The human ability to perceive changes in noise levels varies widely with the individual, as do responses to the perceived changes. A change in noise level of less than three dBA is barely perceptible to most listeners while a ten dBA change normally is perceived as a doubling (or halving) of noise. These factors inform the estimation of an average individual's probable perception of, and reaction to, changes in noise levels.



The dBA noise metric describes noise levels in a static way, but noise levels are rarely steady and unchanging. Therefore, methods to describe and evaluate changing noise levels over time have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific period as if it had been a steady, unchanging sound.

#### *DNL/CNEL Metric*

It is often useful when measuring noise levels to take into account the difference in perception and response between daylight (waking hours), and nighttime (sleeping hours). To this end, a descriptor called the day-night average sound level (DNL) has been developed: DNL is defined as the A-weighted average sound level during a 24-hour period, with a 10-dBA penalty weighting applied to noise occurring during nighttime (10 pm to 7 am). The ten-dBA weighting accounts for the fact that noises at night are more perceptible because of the decreased overall sound level.

The noise environment around airports in the State of California is also described in terms of community noise equivalent level (CNEL). The measure of CNEL is essentially the same as DNL except in CNEL, the 24-hour period is broken into three periods: day (7 am to 7 pm), evening (7 pm to 10 pm), and night (10 pm – 7 am). Weightings of 5 dBA are applied to the evening period and 10 dBA to the night period. For most time distributions of aircraft noise around airports, the numerical difference between a two-period and three-period day are not significant, being 0.7 dBA at most.

The DNL descriptor has been recognized by the Department of Housing and Urban Development (HUD), the U.S. EPA, the FAA, and DOD as one of the most appropriate metrics for estimating the degree of nuisance or annoyance that increased noise levels would cause in residential neighborhoods. Consequently, given the close equivalence of DNL and CNEL, both metrics were considered as appropriate in this analysis.

#### *Sound Exposure Level Metric*

Sound Exposure Level (SEL) characterizes a discrete noise-generating event (e.g., an aircraft flight over). An individual time-varying event has two main characteristics: a noise level that changes through the event and a period of time during which the event is heard. The SEL provides a measure of the net impact of the entire sound event, but it does not directly represent the noise level at any given time. During an aircraft flyover, the SEL would include both the maximum noise level and the lower noise levels produced during the period of flyover. The SEL assumes all the energy of the noise-generating event is compressed into a one-second time duration and represents the noise level of a constant noise that would, in one second, generate the same acoustic energy as the actual time-varying noise event. This metric was used for a comparison of aircraft event noise in this EA/OEA where appropriate.

## Noise Standards and Criteria

Federal agencies have adopted various standards and guidelines for assessing noise impacts. These regulations and standards are useful to review because they provide both a characterization of the quality of the existing noise environment, and a measure of project-induced impacts where applicable.

### *HUD Environmental Criteria and Standards*

HUD has adopted environmental standards, criteria, and guidelines for determining the acceptability of federally-assisted projects, and proposed mitigation measures to ensure that activities assisted by HUD will achieve the goal of a suitable living environment. However, these guidelines are strictly advisory.

HUD assistance for the construction of new noise-sensitive land uses is generally prohibited for projects with “unacceptable” noise exposure and is discouraged for projects with “normally unacceptable” (as defined in Table 3.3-1) noise exposure. This policy applies to all HUD programs for residential housing, college housing, mobile home parks, nursing homes, and hospitals. It also applies to HUD projects for land development, new communities, redevelopment, or any other provision of facilities and services that are directed toward making land available for housing or noise-sensitive development.

**Table 3.3-1. HUD Site Acceptability Standards**

Noise	Day/Night Sound Level (DNL)
Acceptable	Not exceeding 65 dBA
Normally Unacceptable	Above 65 dBA but not exceeding 75 dBA
Unacceptable	Above 75 dBA

Source: 24 CFR Part 51.

Sites falling within the “normally unacceptable” noise exposure zone require mitigation, such as implementation of sound attenuation or reduction measures: 5-dBA reduction if the DNL (also applicable for CNEL) is greater than 65 dBA but does not exceed 70 dBA, and 10-dBA reduction if the DNL (or CNEL) is greater than 70 dBA but does not exceed 75 dBA. If the DNL (or CNEL) exceeds 75 dBA, the site is considered unacceptable for residential use.

### *Aviation Noise Standards*

In June 1980, the Federal Interagency Committee on Urban Noise published guidelines relating the DNL noise descriptor to compatible land uses. This committee was composed of representatives of DOD, the Department of Transportation, HUD, the U.S. EPA, and the Veterans Administration. Since the issuance of these guidelines, federal agencies have generally adopted them for their noise analyses.

Following the lead of the committee, DOD and the FAA adopted these land use compatibility guidelines as the accepted measure of aircraft noise effect. The FAA incorporated the committee's guidelines in the Federal Aviation Regulations. Although these guidelines are not mandatory, they provide the best means for determining noise impacts in airport communities. In general, residential land uses are not considered compatible with an outdoor DNL above 65 dBA. To the extent that land areas and populations are exposed to a DNL of 65 dBA or higher a means for assessing and comparing the noise impacts of alternative aircraft actions is obtainable.

Furthermore, according to FAA Order 1050.1E, *Environmental Policy and Procedures*, a significant noise impact would occur if analyses show that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dBA or more at or above DNL 65 dBA noise exposure when compared to the No Action Alternative. The guidance also concludes that a 17-percent increase in the 65 dBA DNL contour area is approximately equivalent to a 1-dBA increase in DNL below which the noise impact is not considered significant. Using these guidelines, potential aircraft operational noise impacts are estimated at the proposed IOT&E locations.

### **Baseline Noise Conditions**

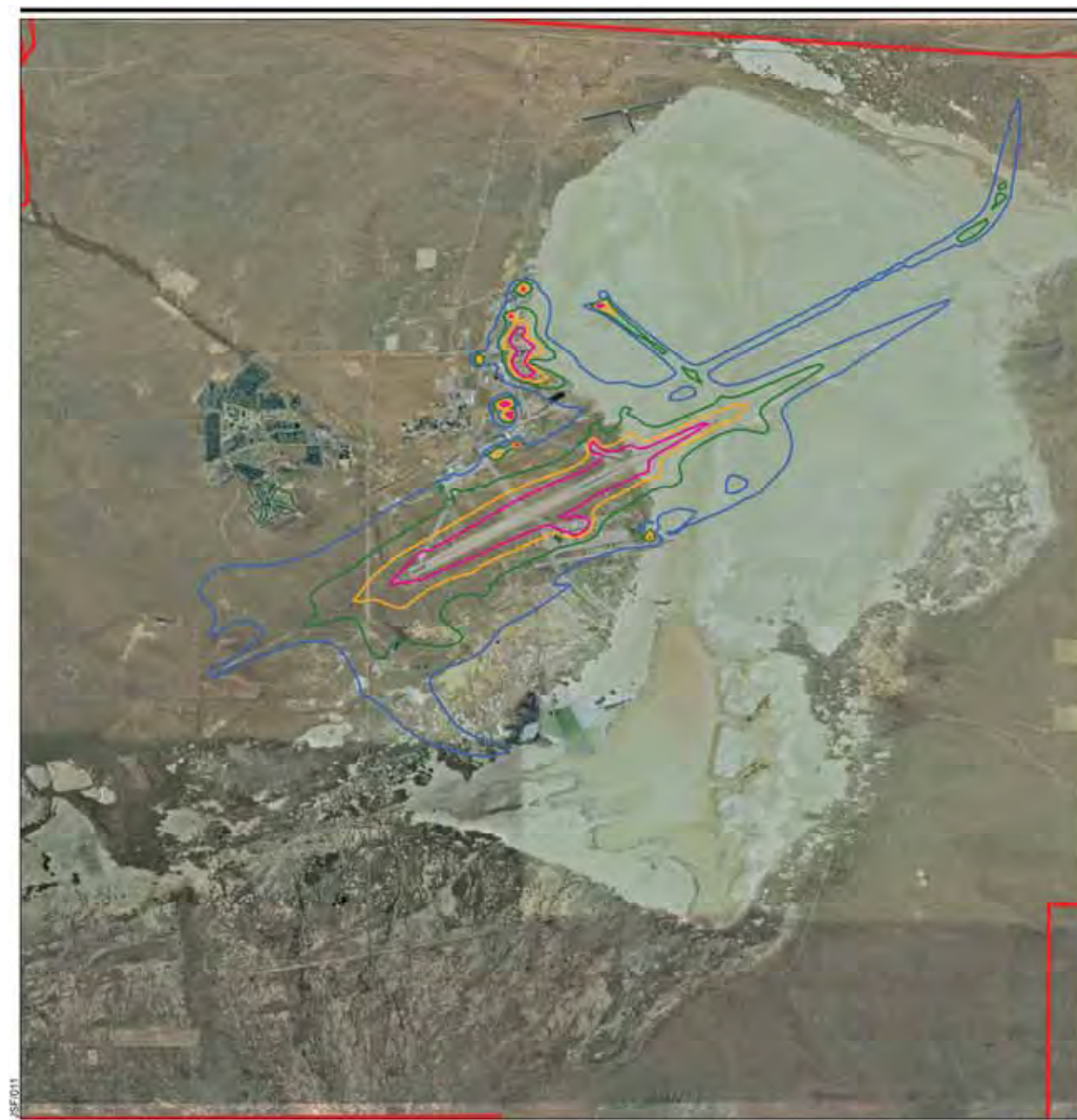
Baseline noise conditions at the proposed JSF IOT&E locations are described in the following sections.

#### **3.3.1 Edwards Air Force Base**

The ROI for Edwards AFB includes the base. The primary noise sources at Edwards AFB are subsonic and supersonic aircraft operations. Secondary sources include surface traffic, rail service operations, engine run-up and other tests, and equipment required for ground facilities operations.

Current aircraft operations out of Edwards AFB are both subsonic and supersonic. Noise due to subsonic flights is produced from engine/propulsion noise and airflow noise generated as the airframe passes through the air. The same noise sources are present with supersonic flights, but the aircraft are often at such an altitude that this noise has been greatly reduced because of distance and atmospheric absorption.

Figure 3.3-1 presents the CNEL 65-dBA and greater contours for operations at Edwards AFB. The area within the CNEL 65-dBA contour totals 11,472 acres and is contained within the base boundary. The noise contours are based on a daily average of approximately 168 aircraft operations. F-16C aircraft account for the largest percentage (approximately 19 percent) of daily operations at Edwards AFB. Other aircraft that perform a significant percentage of daily operations include B-1, C-12, F-15A, F/A-18A/B/C, F-22, KC-135R, T-38A, and T-45 (Joint Strike Fighter Program Office, 2007).



**EXPLANATION**  
 Baseline  
 80 dB  
 75 dB  
 70 dB  
 65 dB  
 Base Boundary



**Edwards AFB Baseline  
 CNEL Contours**

**Figure 3.3-1**

The Air Installation Compatible Use Zone (AICUZ) program was established by the DOD to prevent incompatible development adjacent to military facilities. According to Air Force guidelines, an installation's AICUZ study should be updated when noise levels increase by more than DNL 2 dBA. Because the CNEL 65-dBA contour does not extend off base, Edwards AFB does not have an AICUZ study.

The most recent versions of NOISEMAP, BaseOps (Version 7.32), and NMPLOT (Version 4.96), and various computer models were used to generate the baseline noise contours around Edwards AFB. NOISEMAP and associated models are used to predict the potential noise exposure produced by aircraft operations (e.g., departures, arrivals, closed patterns, and maintenance) in and around military airfields. These models incorporate a database of known sound levels from various aircraft, and use mathematical procedures which consider the degradation of sound energy over distance as well as other sound propagation factors. The NMPLOT model is a unique tool to view and edit sets of georeferenced data points created in BaseOps software, and has been incorporated in the NOISEMAP model for developing noise contours.

The baseline noise contours at Edwards AFB were developed for the DT EA/OEA. The study predicted noise contours (Figure 3.3-1) based on 2005 conditions that reflect the noise generated by 2005 fleet, both civilian and military. The amount of land within each predicted CNEL contour are summarized in Table 3.3-2.

**Table 3.3-2. 2005 Edwards AFB Baseline Noise Contour Areas**

<b>CNEL Contour (dBA)</b>	<b>Area within Contour (acres)</b>
65-70	6,820
70-75	2,502
75-80	1,065
More than 80	1,085
Total	11,472

### **3.3.2 Test Ranges**

The ROI for noise on the test ranges includes the test range and adjacent air spaces as shown in Figures 2.2-2 through 2.2-7.

#### **3.3.2.1 R-2508 Complex.**

Within the R-2508 Complex, the participating aircraft are typically high-performance prototypes or existing operational aircraft such as the F-15, F-16, F-18, or F-22. Ambient noise originates principally from vehicle traffic on highways, off-road recreational vehicles, trains, and construction activities. However, on- and off-road traffic in much of the area underlying the R-2508 Complex is generally low except along major roadways. Military aircraft operations and traffic on highways are generally the most significant noise sources. Ambient noise in rural residential areas typically ranges from DNL 30 to 50 dBA, and in urban residential areas the average is 60 to 70 dBA. These

ranges are anticipated within R-2508 Complex depending on specific area location (Air Force Flight Test Center Environmental Management Directorate, 2005).

#### **3.3.2.2 *Naval Air Warfare Center Weapons Division China Lake.***

The primary sources of noise at NAWCWD China Lake include range flight operations, airfield flight operations, and the use of high energy ordnance (delivered during air-to-surface and surface-to-surface operations) on the ranges. Other sources of noise include routine daily commuter traffic, routine operations, and maintenance activities for station facilities and infrastructure, and occasional facility demolition activities.

Most of the dispersed flight activity over the North and South Ranges occurs at altitudes of 5,000 feet or more AGL. The modeled average existing noise level for all land use management units at NAWCWD were below CNEL 60 dBA. Range flight operations produces annual average CNEL noise exposure contours ranging from 56 dBA or less.

#### **3.3.2.3 *Naval Air Warfare Center Weapons Division Point Mugu.***

The ROI for noise associated with IOT&E test range activities consists of the Sea Range. The main station at Point Mugu, on the mainland, would not be used for any test range activities and therefore is not considered part of the ROI for these activities.

Noise sources in the Sea Range are transitory and widely dispersed and they primarily include flight activity of aircraft, aerial targets, and missiles. Noise produced by marine vessels is negligible compared to that produced by low-flying aircraft and targets. Aircraft that operate in the Sea Range most often include: QF-4, F-14, F/A-18, EA-6B, AV-8B, S-3, NP-3D, and helicopters. Aerial targets used include full-scale fixed wing and rotary wing aircraft, and subscale subsonic and supersonic targets. Targets are powered by rocket motors, jet engines, or a combination of both. Noise levels from aerial targets is considered negligible compared to that produced by full scale aircraft (Department of the Navy, 2002).

The Sea Range covers very little land area (see Figure 2.2-3). Few structures occur within areas encompassed by the Sea Range and no public communities are present beneath Sea Range airspace that are subject to routine aircraft overflights.

#### **3.3.2.4 *Nevada Test and Training Range.***

Numerous Air Force and other service aircraft operate on a regular basis within the NTTR, participating in various combat-readiness training exercises. These exercises include both subsonic and supersonic activity. NTTR use has historically ranged between 200,000 and 300,000 sortie-operations annually. (A sortie-operation at NTTR consists of 1 aircraft transiting 1 airspace unit. During a typical sortie on the NTTR, an aircraft transits through 6 airspace units. Therefore a typical sortie consists of 6 sortie-operations.) F-16s and F-15s are used to

conduct approximately 70 percent of the sortie-operations in the NTTR. Noise levels on NTTR, described as Onset Rate-Adjusted Monthly Day-Night Average Sound Level ( $L_{dnmr}$ ) (similar to DNL), were calculated for each airspace unit for both the 200,000 sortie-operation and 300,000 sortie-operation scenarios. The lowest noise level under the 200,000 sortie operation scenario is less than 45 dBA  $L_{dnmr}$  in one airspace unit and the highest noise level under the 300,000 sortie-operation scenario is 65 dBA  $L_{dnmr}$  in another airspace unit. Overall noise levels on NTTR range from 49 dBA  $L_{dnmr}$  to 51 dBA  $L_{dnmr}$  under each scenario respectively. Cumulative noise levels are below 65 dBA  $L_{dnmr}$  (U.S. Air Force Air Combat Command, 2008a). The  $L_{dnmr}$  in all airspace is within normally acceptable land use compatibility guidelines.

### **3.3.2.5 Utah Test and Training Range.**

Noise sources on UTTR consist primarily of two activities: aircraft and detonations. Aircraft flight operations occur on both UTTR-North and UTTR-South, and flight altitudes at times extend nearly to the surface. Detonations may occur as the result of expending live ordnance at designated target zones and destruction of large solid rocket motors at the Thermal Treatment Unit (Department of the Air Force, 2008).

Aircraft using UTTR fly an average of 16,000 sorties per year. During FY 2005, U.S. Air Force fighters flew 11,428 sorties which accounted for 90 percent of the total of 12,661 sorties flown that year (Department of the Air Force, 2008).

Almost all of the land under the flight operation area is rural countryside with low background noise levels, but with existing conditions of sporadic overflight by low-level military aircraft. Estimated DNL noise exposures from low-level operations at UTTR range from 50 dBA to 64 dBA in the overflown valleys and less in the adjacent mountain areas. Since aircraft do not fly along fixed routes, the existing aircraft activity within the UTTR is not well defined. With the exceptions of avoiding identified noise sensitive areas and altitude minimums and maximums, the aircraft are free to maneuver throughout the area. The Air Force has evaluated noise exposure on the UTTR-South range based on the number of flights, aircraft types, flight altitudes, speeds, and engine power settings. The findings for the UTTR-South Range indicated DNL noise contours of 65 dBA predominantly along the eastern boundary due to a concentration of flight activity en route to target areas (Department of the Air Force, 2008).

### **3.3.2.6 White Sands Missile Range.**

The U.S. Air Force uses the airspace over the range areas of WSMR for approach and departure routing to Holloman AFB, flights transiting the area en route to western and northern tactical training areas, gunnery pattern routes using the gunnery ranges, and supersonic air combat training. Generally, flight activities are at a high-enough altitude and a low-enough frequency to generate event sound levels anticipated to be no greater than 70 dBA, which is equivalent to the sound level of freeway traffic. Other significant sources of noise in WSMR's operational testing areas include missile launches, ordnance explosions, aircraft drone overflights, gun firing, general vehicle traffic, and low-

altitude military jet traffic. Typical DNL noise levels have been estimated to be 55 – 65 dBA, at the WSMR Main Post area (the only populated center), 45-55 dBA at the WSMR southern property boundary, and 45 dBA at the San Andres National Wildlife Refuge (NWR), which is located approximately 12 miles north of the WSMR Main Post area (Joint Strike Fighter Program Office, 2007).

### **3.3.2.7    *National Training Center Fort Irwin.***

Military aircraft are the primary contributors to the existing noise environment at NTC Fort Irwin. Fixed wing aircraft that support NTC exercise training (Air Warrior) fly from Nellis AFB near Las Vegas, Nevada. Secondary contributors to the noise environment include commercial and private aircraft that fly outside Fort Irwin's existing boundaries, and vehicular traffic along I-15 and State Highway 127 (Calibre, 2006).

Aerial operations at the NTC include helicopters and fixed wing aircraft. In a typical simulated combat situation, approximately 34 helicopters and 25 fixed wing aircraft are flown on a daily basis. Some of these operations occur during the night. The width of the 65 dBA DNL contours along these routes varies from 0-600 ft wide near Fort Irwin. However, because of the low number of flight operations on those corridors and their remote location, the aircraft noise impact beyond Fort Irwin boundaries for these operations are minimal (Calibre, 2006).

### **3.3.2.8    *Marine Corps Air Station Yuma Ranges.***

IOT&E test range activities would take place at the MCAS Yuma Ranges. The MCAS Yuma installation would be used for a deployment demonstration and information on existing aircraft activity at the MCAS Yuma airfield is presented in Section 3.3.3.

Of the total of 43,147 sorties flown on the MCAS Yuma Ranges (Bob Stump Training Range Complex), the largest number flown by a single type of aircraft was the 18,691 sorties (43 percent of total) flown by the FA-18 (Department of the Navy, 2006).

### **3.3.3    *Deployment Demonstration Locations.***

Existing noise conditions around deployment demonstration locations are primarily dominated from aircraft operations and ground traffic around each airfield. Table 3.3-3 summarizes the total aircraft operations including military aircraft operation component at each airfield.

## **3.4    *BIOLOGICAL RESOURCES***

Biological resources include the native and introduced plants and animals that may occur within the project area. For discussion purposes, biological resources are divided into vegetation, wildlife, threatened and endangered species, and sensitive habitats. Threatened or endangered species include those plants and animals afforded protection under the federal ESA of 1973, as amended, and



**Table 3.3-3. Deployment Demonstration Location Existing Flight Operations**

<b>Deployment Demonstration Airfield</b>	<b>Total Aircraft Operations</b>	<b>Military Aircraft Operations</b>
Alpena CRTC <sup>(1)</sup>	15,595	3,831
Eglin AFB <sup>(1)</sup>	126,060	90,000
MCAS Yuma <sup>(1)</sup>	121,642	61,645
MCAGCC Twentynine Palms <sup>(2)</sup>	4,753	4,753
NAS Lemoore <sup>(3)</sup>	178,904	177,449
Volk Field ANGB <sup>(2)</sup>	5,569	5,373

Notes:     <sup>(1)</sup>   Federal Aviation Administration airport master record for 2007 operations.  
               <sup>(2)</sup>   Baseline NOISEMAP model input.  
               <sup>(3)</sup>   Aircraft Noise Study for NAS Lemoore, September 2008.

other legislation. Sensitive habitats include wetlands, plant communities that are unusual or are of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding and nesting areas, environments that are vital to the existence of a species).

The ROI for biological resources is the area potentially affected by the project activities, including ground operations, flight activities, and weapons missions. This includes Edwards AFB, the test range areas of the R-2508 Complex, NAWCWD China Lake, NAWCWD Point Mugu Ranges, NTTR, UTTR, WSMR, NTC Fort Irwin, and MCAS Yuma Ranges, and the deployment demonstration installations of Alpena CRTC, Eglin AFB, MCAGCC Twentynine Palms, NAS Lemoore, and Volk Field ANGB.

### **3.4.1 Edwards Air Force Base**

**Vegetation and Wildlife.** Edwards AFB is located in the Mojave Desert of California. The base is in the area encompassed by the R-2508 Complex. The vegetation and wildlife of the Mojave Desert are described in Section 3.4.2.1, R-2508 Complex.

**Threatened and Endangered Species.** Threatened and endangered species for Edwards AFB are included in the list of threatened and endangered species for the R-2508 Complex (see Table 3.4-1). The primary species of concern on Edwards AFB is the federally threatened desert tortoise (*Gopherus agassizii*). The Mohave ground squirrel (*Spermophilus mohavensis*), a state threatened species that has a pending 90-day petition for listing under the federal Endangered Species Act, is also found on Edwards AFB.

**Sensitive Habitats.** Two sensitive ecological areas, as defined by the county of Los Angeles, occur within Edwards AFB. Piute Ponds, in the southwestern corner of the base, supports a significant number of waterfowl and provides a stopover area for migratory birds. Mesquite woodlands, in the south-central portion of Edwards AFB, provide a unique habitat for wildlife such as phainopepla (*Phainopepla nitens*) and loggerhead shrike (*Lanius ludovicianus*) (Department of the Air Force, 2001).

**Table 3.4-1. Federally Listed Animal Species for the R-2508 Complex Area, California**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<b>Fish</b>		
<i>Cyprinodon radiosus</i>	Owens pupfish	Endangered
<i>Gila bcolor snyderi</i>	Owens tui chub	Endangered
<i>Gila bicolor mohavensis</i>	Mohave tui chub	Endangered
<i>Oncorhynchus clarki henshawi</i>	Lahontan cutthroat trout	Threatened
<i>Oncorhynchus clarki seleniris</i>	Paiute cutthroat trout	Threatened
<b>Reptiles and Amphibians</b>		
<i>Bufo californicus</i>	Arroyo toad	Endangered
<i>Bufo canorus</i>	Yosemite toad	Candidate
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<i>Rana aurora draytoni</i>	California red-legged frog	Threatened
<i>Rana muscosa</i>	Mountain yellow-legged frog	Candidate
<i>Rana sierrea</i>	Sierra Nevada yellow-legged frog	Candidate
<b>Birds</b>		
<i>Coccyzus americanus occidentalis</i>	Western yellow-billed cuckoo	Candidate
<i>Gymnogyps californianus</i>	California condor	Endangered
<i>Pipilo crissalis eremophila</i>	Inyo California towhee	Threatened
<i>Vireo bellii pusillus</i>	Least Bell's vireo	Endangered
<b>Mammals</b>		
<i>Martes pennanti</i>	Fisher	Candidate
<i>Ovis canadensis californiana</i>	Sierra Nevada bighorn sheep	Endangered

Source: State of California, Department of Fish and Game, 2009.

Approximately 65,000 acres (100 square miles or 21 percent) of the base falls within the Fremont-Kramer Desert Tortoise Critical Habitat Unit, one of 12 critical habitat units in the southwestern U.S. (Air Force Flight Test Center, 2008).

### **3.4.2 Test Ranges**

#### **3.4.2.1 R-2508 Complex.**

**Vegetation.** Plant communities within most of the R-2508 Complex contain species that are adapted to the xeric environments of the Mojave Desert. Mojave Desert plant communities include creosote bush scrub, Joshua tree woodland, arid-phase saltbush scrub, halophytic-phase saltbush scrub, lake beds, and mesquite woodlands.

The western portion of the R-2508 Complex overlies the Sierra Nevada Range and a portion of the San Joaquin Valley. The vegetation contained in these regions differs substantially from the xeric vegetation found within the Mojave Desert. Mountain slope elevation and the accompanying microclimate gradient results in a zoning of plant communities on east- and west-facing slopes.

Several coniferous forest types occur in the Sierra Nevada, including red fir forest, yellow pine forest, mixed coniferous forest, and pinyon-juniper woodlands. Subalpine forests dominated by high-elevation pines, and alpine habitats, also known as fell fields, occur at high elevations in the Sierra Nevada.

Foothill grasslands, also known as valley grasslands, are dominated by various grass species. This low-growing herbaceous community is limited to the lower elevations of the western Sierra Nevada and the San Joaquin Valley. Foothill woodlands are dominated by oaks at lower elevations and certain pines at upper elevations on the western side of the Sierra Nevada. Various nondesert scrub communities are also common. Scrub communities found within the R-2508 Complex area include shadscale scrub, chaparral, and sage-grass (also known as sagebrush grassland) (Department of the Air Force, 2001).

**Wildlife.** Wildlife species occurring within the R-2508 Complex include those adapted to a variety of habitats. Brief discussions of wildlife species by general habitat type found in the R-2508 Complex area are provided below.

Mojave Desert. Widespread wildlife within the Mojave Desert includes native species including kangaroo rats (*Dipodomys* spp.), western pipistrelle (*Pipistrellus hesperus*), little brown bat (*Myotis lucifugus*), desert woodrat (*Neotoma lepida*), deer mouse (*Peromyscus maniculatus*), coyote (*Canis latrans*), and bobcat (*Felis rufus*). Common birds include turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), sage sparrow (*Amphispiza belli*), and western meadowlark (*Sturnella neglecta*). Reptiles common to all desert habitats include desert spiny lizard (*Sceloporus magister*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), and zebra-tailed lizard (*Callisaurus draconoides*).

Birds are very mobile species and tend to occupy favored habitats within their range. Common bird species found within the Mojave Desert include red-tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferus*), and white-crowned sparrow (*Zonotrichia leucophrys*).

Coniferous Forests and Alpine/Subalpine. Amphibians typically found in coniferous forests include salamanders (*Batrachoseps* spp.), western toad (*Bufo boreas*), and mountain yellow-legged frog (*Rana muscosa*). Reptiles include Sierra alligator lizard (*Gerrhonotus coeruleus*), rubber boa (*Charina bottae*), and western rattlesnake (*Crotalus viridis*).

Bird species found throughout montane habitats in California include mountain chickadee (*Parus gambeli*), yellow-rumped warbler (*Dendroica coronata*), Clark's nutcracker (*Nucifraga columbiana*), and Williamson's sapsucker (*Sphyrapicus thyroideus*). Seasonal migrants include mountain bluebird (*Sialia currucoides*), dark-eyed junco (*Junco hyemalis*), and white-crowned sparrow (*Zonotrichia leucophrys*).

Mammals commonly found in montane habitats include black bear (*Ursus americanus*), mountain lion (*Felis concolor*), and yellow-bellied marmot (*Marmota flaviventris*).

Foothill Grasslands. Amphibians typically found in foothill grasslands include western toad and Pacific tree frog (*Pseudacris regilla*). Reptiles include California whiptail (*Cnemidophorus tigris mundus*) and western rattlesnake.

Bird species found throughout San Joaquin grasslands include western meadowlark, horned lark (*Eremophila alpestris*), yellow-billed magpie (*Pica nuttalli*), and white-tailed kite (*Elanus leucurus*). Seasonal migrants include western bluebird (*Sialia mexicana*) and white-crowned sparrow.

Mammals commonly found in grassland habitats include coyote, long-tailed weasel (*Mustella frenata*), and California ground squirrel (*Spermophilus beecheyi*).

Foothill Woodlands. Amphibians and reptiles typically found in foothill woodlands include many of the same species found in other woodlands and grasslands. Bird species found in foothill woodland habitats include acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), great-horned owl (*Bubo virginianus*), and bushtits (*Psaltirparus minimus*). Seasonal migrants include Hutton's vireo (*Vireo huttoni*), Bullock's oriole (*Icterus bullockii*), and lark sparrow (*Chondestes grammacus*).

Mammals commonly found in foothill woodlands include mule deer (*Odocoileus hemionus*), bobcat, and California myotis bat (*Myotis californicus*).

Scrub. Amphibians and reptiles typically found in scrub include toads (*Bufo* spp.), side-blotched lizard, and western fence lizard (*Sceloporus occidentalis*). Bird species found in scrub include scrub jay (*Aphelecoma coerulescens*), wrentit (*Chamea fasciata*), Bewick's wren (*Thryomanes bewickii*), and California thrasher (*Toxostoma redivivum*). Mammals commonly found in scrub include brush rabbit (*Sylvilagus bachmani*), gray fox (*Urocyon cinereoargentinus*), and light-footed woodrat (*Neotoma fuscipes*) (Department of the Air Force, 2001).

**Threatened and Endangered Species.** The R-2508 Complex encompasses portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare counties. Federally threatened and endangered animal species listed for the portions of these counties containing the R-2508 Complex are listed in Table 3.4-1.

**Sensitive Habitats.** Sensitive habitats include federally and state-regulated wetlands, sensitive species habitat, plant communities that have been identified as unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., breeding and nesting areas).

Many playas, ephemeral and vernal pools, meadows, marshes, rivers, lakes, and drainages throughout the R-2508 Complex potentially qualify as Waters of the United States. These areas are protected by Section 404 of the federal Clean Water Act and are under the jurisdiction of the U.S. Army Corps of Engineers.

In addition to wetlands and riparian areas, the R-2508 Complex contains USFWS-designated critical habitat for several protected species. Desert tortoise critical habitat is present within the ROI. Important habitat for desert bighorn sheep and species identified in the Threatened and Endangered Species section also occur within the ROI. Some pools and drainages are the only habitat for certain fish species, such as pupfish (Department of the Air Force, 2001).

#### **3.4.2.2 Naval Air Warfare Center Weapons Division China Lake.**

**Vegetation and Wildlife.** NAWCWD China Lake is located in the Mojave Desert of California. The installation is in the area encompassed by the R-2508 Complex. The vegetation and wildlife of the Mojave Desert are described in Section 3.3.1.2, R-2508 Complex.

**Threatened and Endangered Species.** Threatened and endangered species for NAWCWD China Lake are included in the list of threatened and endangered species for the R-2508 Complex (Table 3.4-1). Resident threatened or endangered animals known to occur on NAWCWD China Lake are Mojave tui chub (*Gila bicolor mohavensis*), desert tortoise, and Inyo California towhee (*Pipilo crissalis eremophila*). In addition, several nonresident threatened or endangered bird species occur as transients or migrants (Naval Air Weapons Station, 2004).

**Sensitive Habitats.** Sensitive habitats on NAWCWD China Lake include wetlands and desert tortoise habitat. More than 120 springs have been identified at NAWCWD China Lake. These springs range from small areas with almost imperceptible discharge to areas supporting extensive riparian vegetation with discharges of up to 6 gallons per minute. NAWCWD China Lake contains several major playas and as many as 80 smaller playas, ranging from hundreds of acres to less than 1.0 acre. Two of the three federally listed resident species on NAWCWD China Lake are found in wetlands habitats. The Mojave tui chub is found in seeps and associated channels and the Inyo California towhee is restricted to areas of riparian habitats. NAWCWD China Lake has a programmatic biological opinion (BO) to provide limited authority to construct facilities and conduct military operations in tortoise habitat without project-by-project consultation with the USFWS. Under this BO, a Desert Tortoise Management Area encompassing approximately 200,000 acres was created. The BO authorized the implementation of the installation's Desert Tortoise Habitat Management Plan (Naval Air Weapons Station, 2004).

#### **3.4.2.3 Naval Air Warfare Center Weapons Division Point Mugu.**

The Point Mugu Sea Range encompasses a 36,000 square mile area. The Sea Range straddles the ocean off Point Conception which is considered a major geographic feature that affects marine biological diversity. North of Point Conception, the marine resources are under the influence of the cold, southward flowing California Current. The shape of California's coastline south of Point Conception creates a broad ocean embayment known as the Southern California Bight (SCB). The SCB is influenced by two major oceanic currents: the southward flowing, cold-water California Current and the northward flowing,

warm-water California Countercurrent. These currents mix in the SCB and cause extreme differences in species composition and abundance both north and south of Point Conception, as well as within the SCB. Although it encompasses some terrestrial areas consisting of several of the Channel Islands, the majority of the Sea Range and the area where JSF IOT&E would occur is open ocean. Therefore, this discussion, which is derived from the Point Mugu Sea Range Environmental Impact Statement/Overseas Environmental Impact Statement (Department of the Navy, 2002), focuses on marine biology.

**Vegetation.** Vegetation in the Sea Range consists of marine flora. Most of the marine flora in the Sea Range is comprised of phytoplankton. Phytoplankton are made up of mainly diatoms and dinoflagellates. About 70 percent of the known algae species from California are known to occur in the SCB, and, therefore, within the Point Mugu Sea Range. Kelp beds form a unique shallow water community which provides habitat for a range of additional algal species, invertebrates, and fish. Extensive stands of giant kelp (*Macrocystis*) extend from the sea floor to the surface.

**Wildlife.** About 481 species of fish inhabit the SCB. For the period 1994 to 1995, the most commonly harvested commercial species in the Sea Range were Pacific sardine, Pacific mackerel, yellow fin and skipjack tuna, rockfish, northern anchovy, swordfish, Dover sole, and thresher shark. Four species of sea turtles found in U.S. waters are known to occur at sea within the Point Mugu Sea Range. All are currently listed as either endangered or threatened under the ESA. These include loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), eastern Pacific green (*Chelonia agassizi*), and olive ridley (*Lepidochelys olivacea*).

At least 34 species of cetaceans have been identified in the SCB. At least nine species generally can be found in the study area in moderate or high numbers either year-round or during annual migrations into or through the area. These include the Dall's porpoise (*Phocoenoides dalli*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Risso's dolphin (*Grampus griseus*), bottlenose dolphin (*Tursiops truncatus*), short-beaked and long-beaked common dolphins (*Delphinus delphis* and *D. capensis*), northern right whale dolphin (*Lissodelphis borealis*), Cuvier's beaked whale (*Ziphius cavirostris*), and gray whale (*Eschrichtius robustus*). Six species of pinnipeds occur in the Point Mugu Sea Range. The four most abundant species include the harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*), and northern fur seal (*Callorhinus ursinus*). These four species breed on land within the Sea Range. The southern sea otter (*Enhydra lutris nereis*) occurs along the coast of central California between Point Año Nuevo and Purisima Point, and a small experimental population has been translocated to San Nicolas Island. Aside from the small translocated population at San Nicolas Island, few sea otters are expected to occur within the Point Mugu Sea Range because of their preference for relatively shallow coastal waters. Over 195 species of seabirds use open water, shore, or island habitats in the SCB. The majority of seabirds that are found in the SCB and the Sea Range are transitory, migrating in and out of the area according to breeding season. All

seabirds that breed within the SCB, with the exception of terns, do so on the Channel Islands.

**Threatened and Endangered Species.** Federally listed species that have the potential to occur in the Point Mugu Sea Range can be found in Table 3.4-2. In addition, all marine mammals are protected by the Marine Mammal Protection Act ([MMPA] 1972, amended 1994 - 16 U.S.C. § 1431 et seq.). Several of the “endangered” species have also been listed as “strategic stocks” under the MMPA. A “strategic stock” is a stock in which human activities may be having a deleterious effect on the population and may not be sustainable. The stocks of blue (*Balaenoptea musculus*), fin (*Balaenoptera physalus*), sei (*Balaenoptera borealis*), and humpback (*Megaptera novaengliae*) whales occurring off California are considered “strategic”. In addition, the California stocks of the short-finned pilot whale (*Globicephala macrorhynchus*) and sperm whale

**Table 3.4-2. Federally Listed Animal Species for the Point Mugu Sea Range Area**

Scientific Name	Common Name	Status
<b>Fish</b>		
<i>Eucyclogobius newberryi</i>	Tidewater goby	Endangered
<i>Oncorhynchus kisutch</i>	Coho salmon	Endangered
<i>Oncorhynchus mykiss</i>	Steelhead trout	Threatened
<b>Reptiles</b>		
<i>Xantusia riversiana</i>	Island night lizard	Threatened
<b>Birds</b>		
<i>Bireo bellii pusillus</i>	Least Bell’s vireo	Endangered
<i>Brachyramphus marmoratus</i>	Marbled murrelet	Threatened
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	Threatened
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Pelecanus occidentalis californicus</i>	California brown pelican	Endangered
<i>Rallus longirostris levipes</i>	Light-footed clapper rail	Endangered
<i>Sterna antillarum browni</i>	California least tern	Endangered
<i>Synthliboramphus hypoleucus</i>	Xantus’s murrelet	Candidate
<b>Mammals</b>		
<i>Arctocephalus townsendi</i>	Guadalupe fur-seal	Threatened
<i>Balaena glacialis</i>	Right whale	Endangered
<i>Balaenoptera borealis</i>	Sei whale	Endangered
<i>Balaenoptera physalus</i>	Finback whale	Endangered
<i>Balaenoptea musculus</i>	Blue whale	Endangered
<i>Enhydra lutris nereis</i>	Southern sea otter	Threatened
<i>Eumetopias jubatus</i>	Steller (=northern) sea-lion	Threatened
<i>Megaptera novaengliae</i>	Humpback whale	Endangered
<i>Physeter macrocephalus</i>	Sperm whale	Endangered
<i>Urocyon littoralis</i>	Island foxes	Endangered

Sources: Department of the Navy, 2002; Missile Defense Agency, 2008.

(*Physeter macrocephalus*) have been designated as “strategic.” The Guadalupe fur seal (*Arctocephalus townsendi*) and the Steller sea lion (*Eumetopias jubatus*) stocks are considered to be strategic populations.

**Sensitive Habitats.** The Channel Islands National Marine Sanctuary (CINMS) encompasses the waters within 6 nautical miles of San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara islands. The Channel Islands National Park (CINP) boundaries extend 1 nautical mile beyond the coast of each of these islands. The CINMS was established in 1980 for the purpose of protecting areas off the southern California coast which contain significant marine resources.

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA; 16 U.S.C. §§ 1801 - 1882) were implemented “to identify and protect important marine and anadromous fish habitat.” In accordance with these amendments, NMFS has developed Fishery Conservation Management Plans that identify Essential Fish Habitat. Two of the three Essential Fish Habitat zones that have been identified off the west coast of the U.S., Coastal Pelagic and Groundfish, occur within the Point Mugu Sea Range, both extending from the coastline out to 200 miles offshore along the entire length of the west coast of the U.S.

#### **3.4.2.4 Nevada Test and Training Range.**

**Vegetation.** Due to differences in habitats, the North and South ranges support somewhat different biological resources. The North Range is a transitional area between the Mojave Desert and Great Basin that supports a mixture of community types, including creosote bush scrub, Joshua tree woodland, pinyon juniper woodland, mixed desert scrub community, Great Basin sagebrush scrub, black sagebrush scrub, and a sparsely vegetated rock outcrop community. Farther north, the North Range fully transitions to the Great Basin Desert, dominated by sagebrush and saltbush vegetation. The vegetation of the basin floors of the North Range is typified by shadscale (*Atriplex confertifolia*) and greasewood (*Sarcobatus baileyi*) and may include winter fat (*Ceratoides lanata*) and green molly (*Poecilia sphenops*). Most of the middle- and upper-elevation bajadas are dominated by the sagebrush/pinyon/juniper community. Additional species that occur in this community include: rabbitbrush (*Chrysothamnus Greenei* ssp. *filifolius*), joint fir (*Ephedra* spp.), and occasional Joshua trees (*Yucca brevifolia*). Scattered Utah juniper (*Juniperus osteosperma*) can occur on the flanks near the upper limit of sagebrush vegetation. The dominant vegetation type in the North Range mountains, above approximately 5,000 feet, is pinyon juniper woodland, with big sagebrush (*Artemisia tridentata*) dominating the shrub layer. White fir (*Abies concolor*) occurs at elevations above approximately 8,000 feet, with single leaf pinyon (*Pinus monophylla*) and limber pine (*Pinus flexilis*).

The South Range lies in the northeastern portion of the Mojave Desert. Creosote bush, white bursage, and saltbush communities are the most common vegetation communities on the South Range. Where soils are especially alkaline and clay-rich, as on the margins of dry lake beds (playas) at the lowest elevations, saltbush species including four-wing saltbush (*Atriplex canescens*), cattle-



spinach (*Atriplex polycarpa*), and shadscale dominate the vegetation. Saltbush communities, especially near playas, may consist exclusively of these species. Vast areas of the basins and bajadas in the Mojave Desert, below approximately 4,000 feet, support plant communities dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Saltbush species, ephedras, brittlebush (*Encelia farinosa*), desert mallow (*Sphaeralcea ambigua*), cacti (especially prickly pears and chollas [*Opuntia* spp.]), and Mojave yucca (*Yucca shidigera*) may also occur in this community.

At higher elevations (approximately 4,000 to 6,000 feet), the blackbrush community may predominate. This community includes blackbrush (*Coleogyne ramosissima*), ephedras, turpentine-broom (*Thamnosma montana*), and range ratney (*Krameria parvifolia*). Joshua tree is another plant that may occur at higher elevations within the creosote bush, white bursage, and the blackbrush communities. The sagebrush pinyon juniper community comprises a woodland that is present on the South Range and is distinctive of the higher elevations of the Mojave and Great Basin Deserts above at least 4,900 feet elevation, and usually above 5,900 feet.

The Consolidated Group of Tribes and Organizations (CGTO), an American Indian group that participates in the Nellis American Indian Program (NAIP), identified 364 plants currently used for foods, medicines, and ceremonial use.

**Wildlife.** Wildlife in the vicinity of the North Range includes species that are primarily associated with Great Basin montane scrub, pinyon juniper woodland, Great Basin desert scrub, desert springs, and open water habitats. Most of the North Range comprises Great Basin habitats, the exceptions being in the southwestern corner, which is part of the transition between Mojave and Great Basin deserts. As a result, many wildlife species associated with both Mojave and Great Basin habitats occur in this area.

Wildlife species associated with Mojave Desert transitional habitats found in the North Range are similar to those found in the South Range. Most of the common, larger mammal species that occur in the North Range habitats are similarly found in the South Range. On the North Range, a population of bighorn sheep (*Ovis canadensis*) inhabits Stonewall Mountain, Cactus Range, and Pahute Mesa. In the South Range, Bighorn Sheep inhabit the Spotted, Pintwater, Sheep, and Desert Ranges. In addition, the rougher, more densely vegetated regions in the higher elevations of the North Range also support mountain lion, bobcat, and mule deer. Pronghorn antelope (*Antilocapra americana*) and wild horses predominantly occupy the desert scrub communities found in the North Range, particularly in Cactus Flat, on alluvial fans bordering Breen Creek, and in the Kawich Valley.

The rodents of the Great Basin desert scrub habitat differ from those of the southern Mojave Desert and include the pallid kangaroo mouse (*Microdipodops pallidus*), dark kangaroo mouse (*Microdipodops megacephalus*), sagebrush vole (*Lagarus curtatus*), and chisel-toothed kangaroo rat (*Dipodomys microps*). Several bat species are documented on the range in a NTTR-commissioned bat survey report (Department of the Air Force, 1999). Six species of bats, of the

20 species potentially occurring in the area, were documented on NTTR including long-legged myotis (*Myotis volans*), fringe-tailed myotis (*Myotis thysanodes pahasapensis*), California myotis, pipistrelle (*Pipistrellus hesperus*), Townsend's big-eared bat (*Plecotus townsendii*), and pallid bat (*Antrozous pallidus*). The California myotis was the most widespread and commonly observed species in the report and was found in all habitats that were sampled.

Bird species typical of the sagebrush community include the sage thrasher (*Oreoscoptes montanus*), sage sparrow, and horned lark. Chukars (*Alectoris chukar*) have been introduced into the area and survive in rocky habitat and desert scrub near freshwater habitat. Raptors, regularly observed in the area, are similar to those found in the Mojave Desert scrub in the South Range. The pinyon juniper woodland supports the greatest bird diversities in the region. Reptiles are less abundant in the North Range, which is colder than the Mojave Desert scrub habitat in the South Range. Some reptile species found in the North Range are also observed in the South Range (e.g., side-blotched and whiptail lizards). Additional species include sagebrush lizard (*Sceloporus graciosus*), leopard lizard (*Gambelia wislizenii*), and the Great Basin rattlesnake (*Crotalus viridis lutosus*). Desert tortoise is not found in the North Range. Amphibians on the North Range are restricted to the rare areas near water and include the Great Basin spadefoot toad (*Scaphiopus hammondi*). Native fishes are not known or expected to occur because of the lack of perennial pools of water, of sufficient extent, to sustain populations during drought.

Wildlife species associated with Mojave Desert habitats found in the South Range are similar to those described above in the North Range section. Most of the common, larger mammal species that occur in the North Range habitats are similarly found in the South Range (U.S. Air Force Air Combat Command, 2008a). According to the CGTO, animal summaries identified by Indian people were included as part of the 1999 Nellis Range withdrawal Legislative Environmental Impact Statement (LEIS).

**Threatened and Endangered Species.** NTTR and its associated restricted airspace and MOAs overlie portions of Clark, Lincoln, and Nye counties, Nevada, and Iron and Washington counties, Utah. Federally listed endangered or threatened animal species for these counties are listed on Table 3.4-3. According to the Integrated Natural Resources Management Plan (INRMP) and the CGTO, desert tortoises occur in low densities in valleys in southern portions of the South Range (Nellis Air Force Base, 2007).

**Sensitive Habitats.** There are several types of wetlands found in the NTTR including salt and brackish water marshes, seeps and springs, riparian (stream) areas, mesquite thickets, and man-made water sources (Department of the Air Force, 2001).

Natural springs are found in nearly all the mountainous areas of the NTTR (Nellis Air Force Base, 1996a). The NAFR contains six areas identified by the USFWS and the state of Nevada as wetlands. These wetlands occur in Railroad Valley/Duckwater Wildlife Management Area (WMA), White River Kirch WMA,

**Table 3.4-3. Federally Listed Animal Species for the NTTR Area, Nevada and Utah**

Scientific Name	Common Name	Status
<b>Invertebrates</b>		
<i>Ambrysus amargosus</i>	Ash Meadows naucorid	Threatened
<b>Fish</b>		
<i>Chrenichthys baileyi baileyi</i>	Hiko White River springfish	Endangered
<i>Chrenichthys baileyi grandis</i>	White River springfish	Endangered
<i>Chrenichthys nevadae</i>	Railroad Valley springfish	Threatened
<i>Cyprinodon diabolis</i>	Devil's Hole pupfish	Endangered
<i>Cyprinodon nevadensis mionectes</i>	Ash Meadows Amargosa pupfish	Endangered
<i>Cyprinodon nevadensis pectoralis</i>	Warm Springs pupfish	Endangered
<i>Empetrichthys latos</i>	Pahrump poolfish	Endangered
<i>Gila cypha</i>	Humpback chub	Endangered
<i>Gila elegans</i>	Bonytail chub	Endangered
<i>Gila robusta jordani</i>	Pahranaagat roundtail chub	Endangered
<i>Gila robusta seminude</i>	Virgin River chub	Endangered
<i>Lepidomeda mollispinis pratensis</i>	Big Spring spinedace	Threatened
<i>Lepidomeda albivallis</i>	White River spinedace	Endangered
<i>Moapa coriacea</i>	Moapa dace	Endangered
<i>Oncorhynchus clarkii henshawi</i>	Lahontan cutthroat trout	Threatened
<i>Plagopterus argentissimus</i>	Woundfish	Endangered
<i>Ptychocheilus lucius</i>	Colorado pikeminnow	Endangered
<i>Rhinichthys osculus nevadensis</i>	Ash Meadows speckled dace	Endangered
<i>Xyrauchen texanus</i>	Razorback sucker	Endangered
<b>Reptiles and Amphibians</b>		
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<i>Rana luteiventris</i>	Columbia spotted frog	Candidate
<i>Rana onca</i>	Relict leopard frog	Candidate
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Gymnogyps californianus</i>	California condor	Endangered
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered
<i>Strix occidentalis lucida</i>	Mexican spotted owl	Threatened
<b>Mammals</b>		
<i>Cynomys parvidens</i>	Utah prairie dog	Threatened

Sources: USFWS, 2008a, 2009m.

Pahranaagat/Key Pittman WMA, Spring Valley, Meadow Valley Wash, and Muddy River/Warm Springs (Department of the Air Force, 2001).

Critical habitats for five protected fish species are present at the NTTR and are localized to certain washes and springs and their associated outflows. Areas of significant topographical relief occur throughout the NTTR. These areas provide nesting habitat for raptors, such as prairie falcon (*Falco peregrinus*) and golden eagle, (*Aquila chrysaetos*) as well as shelter sites for many mammalian species including little brown bat, mountain lion, and bighorn sheep (Department of the Air Force, 2001).

The Desert National Wildlife Range is a unit of the National Wildlife Refuge system, a portion of which lies within the boundary of the NAFR South Range where it is jointly managed by the Air Force and the USFWS. One of its missions is to manage and maintain habitat for desert bighorn sheep. The Pahrnatagat NWR is located east of the South Range. Its lakes and marshes are an important link the Pacific Flyway for migrating birds (Nellis Air Force Base, 2007). Both locations contain sensitive species including numerous raptors such as the bald eagle. According to the CGTO, an important birthing area for desert bighorn sheep is found on the North Range.

#### **3.4.2.5 Utah Test and Training Range.**

**Vegetation.** UTTR is located within the Central Basin and Range ecoregion (USFWS, 2009f). The Hill AFB INRMP identifies the following wildlife habitat classes that are distributed over the three basic landforms of valley flats, bajadas, and mountain massifs.

Rock Outcrops - Vertical rock faces on exposed rocky outcrops characterize rock outcrop habitats where bedrock is a dominant landform feature.

Montane Shrubland, Grassland, Woodland Complex - In the West Desert region of the Great Basin, these communities were once characterized by an open canopy of Utah juniper (*Juniperus osteosperma*), usually as the only tree species. Much of the montane habitats of the West Desert have been burned and denuded of the tree component and as a result a shrub community of black sage (*Artemisia nova*), and grasses such as salina wildrye (*Elymus salinus*), have now become the more common dominant species.

Shadscale, Cheatgrass, Desert Forbs Group - Extensive stands of the vegetation types in this alliance occur in the transition between the greasewood habitat and the uplands or montane habitats. Shadscale shrub lands habitat is one of the most prevalent habitats on the UTTR. It is the most common habitat in which to find the pronghorn that live on or near the UTTR. If a disturbance occurs such as over grazing or fire, cheatgrass (*Bromus tectorum*) usually becomes the dominant type of vegetation of this habitat.

Big Sagebrush Group - Big sagebrush habitat is found on flat to steeply sloped upland landforms. Undisturbed areas of big sagebrush are relatively small on the UTTR.

Greasewood - This habitat is comprised of shrub lands found on dunes around pluvial lakes of the Great Basin. The UTTR has vast areas covered with greasewood habitat.

Vegetated and Sparsely Vegetated Sand Dunes - This habitat is characterized by the formation of wind-formed dunes. Vegetation usually consists of fourwing saltbush and Indian ricegrass (*Achnatherum hymenoides*). Salt cedar (*Tamarix chinensis*) is the only tree present and occurs in large clumps.

Iodine Bush/Saltgrass/Emergent and Sparse Halophytic Vegetation (combined) - This habitat is associated with topographic depressions usually without drainage. These habitats occur on the playa lake plains, low lake terraces and terraced lake plains of the Great Basin. Sparse Halophytic habitat type is present on the margins of the mudflats of the UTTR.

Playa/Salt/Mud Flat - This habitat occurs within the unvegetated mud and salt flats of the Great Basin. The absence of vascular plants is due to the accumulation of salts, high pH, and extended periods of inundation of saline water.

Wetlands - There are approximately 15,000 acres of wetlands near Blue Lake, which is located at the western edge of UTTR-South.

Open Water - The waters of the west desert, including the Great Salt Lake, support a rich and dynamic biological system of regional, national, and global importance. This variety of interdependent habitats includes wetlands ranging from freshwater to hyper saline, playas, shorelines and uplands. The abundance of bird life at Great Salt Lake has earned its designation as a "Western Hemisphere Shorebird Reserve." It is also the site of the breeding ground of one of the four largest colonies of American white pelicans in North America. Five million birds representing 257 species rely on the lake for resident feeding and sanctuary, breeding, or as a migratory stopover (Department of the Air Force, 2008).

**Wildlife.** Wildlife in the Great Basin includes species that are primarily associated with Great Basin montane scrub and pinyon-juniper woodland and occur or are likely to occur under the proposed airspace. The larger mammal species include Rocky Mountain elk (*Cervus elaphus*), pronghorn antelope, and bighorn sheep. At higher elevations, small springs and seeps provide limited watering facilities for domestic livestock (cow, sheep and lambs, horses and ponies). In addition, the rougher, more densely vegetated regions in the higher elevations also support mountain lion, bobcat, mountain goat (*Oreamnos americanus*), and mule deer populations. Beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), coyote, red fox (*Vulpes vulpes*), gray fox, and kit fox (*Vulpes macrotis*) can also be found. Small mammal species include the pygmy rabbit (*Brachylagus idahoensis*), cottontail rabbit, and a variety of shrews, bats, ground squirrels, woodrats, and mice. Typical reptile species include the Great Basin rattlesnake, western fence lizard, and the greater and pygmy short-horned lizards (*Phrysonoma hernandesi* and *P. douglasii*) (U.S. Air Force Air Combat Command, 2008b).

**Threatened and Endangered Species.** UTTR is located in Box Elder and Tooele counties, Utah, but the associated restricted airspace and MOAs that would also be used during JSF IOT&E extend into Juab and Millard counties, Utah, and Elko and White Pine counties, Nevada. Federally listed animal species for these counties are listed in Table 3.4-4. No animal species federally listed as threatened or endangered are known to occur on UTTR (Department of the Air Force, 2008).

**Table 3.4-4. Federally Listed Animal Species for the UTTR Area, Nevada and Utah**

Scientific Name	Common Name	Status
<b>Invertebrate</b>		
<i>Stagnicola bonnevillensis</i>	fat-whorled pond snail	Candidate
<b>Fish</b>		
<i>Chasmistes liorus</i>	June sucker	Endangered
<i>Empetrichthys latos</i>	Pahrump poolfish	Endangered
<i>Lepidomeda albivallis</i>	White River spinedace	Endangered
<i>Oncorhynchus clarkii henshawi</i>	Lahontan cutthroat trout	Threatened
<i>Rhinichthys osculus lethoporus</i>	Independence Valley speckled dace	Endangered
<i>Rhinichthys osculus oligoporus</i>	Clover Valley speckled dace	Endangered
<i>Salvelinus confluentus</i>	Bull trout	Threatened
<b>Amphibians</b>		
<i>Rana luteiventris</i>	Columbia spotted frog	Candidate
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Gymnogyps californianus</i>	California condor	Endangered
<b>Mammals</b>		
<i>Cynomys parvidens</i>	Utah prairie dog	Threatened

Sources: USFWS, 2008a, 2009m.

**Sensitive Habitats.** Sensitive habitats at UTTR include wetland. Approximately 15,000 acres of wetlands near Blue Lake are located at the western edge of UTTR-South. The Utah Division of Wildlife Resources has recognized this area as a unique desert oasis for migrating waterfowl, a warm water fishery, and a recreation area for scuba diving. UTTR also contains approximately 29,000 acres of vegetated mudflats and playas (Department of the Air Force, 2008).

#### **3.4.2.6 White Sands Missile Range.**

As discussed in Section 1.4, significant environmental impacts from IOT&E activities at WSMR are not expected based on the similarity of the scope and

intensity of these activities to those analyzed in the DT EA/OEA at WSMR. Therefore, only a minimal discussion of biological resources is provided for WSMR.

**Vegetation.** WSMR is located in south-central New Mexico near the northern edge of the Chihuahuan Desert region. Most of the surface of WSMR is located on the floor of the Tularosa Basin and Jornado del Muerto where summer rainfall is low. The vegetation on these lowlands induces Chihuahuan Desert scrub, closed-basin scrub, and desert grasslands. Rainfall increases and temperatures decrease with elevation in the Oscura and San Andres mountains. At elevations above the desert scrub and grasslands regions, plains-mesa grasslands may occur. Both desert and plains-mesa grasslands form a broad savanna-like ecotone at higher elevations with the coniferous woodlands that dominate the cooler highlands of the Oscura and San Andres mountains. Junipers (*Juniperus* spp.) characterize the tree story of this transitional area. As slopes become steeper, the savanna develops a more woodland character and montane scrub vegetation forms part of the habitat mosaic. Gradually, pinyon pines (*Pinus edulis*) become more common until, near the summits of both mountain ranges, the coniferous woodlands are dominated by pinyon. Montane scrub continues to be present into the highlands. On Salinas Peak, montane coniferous forest dominated by ponderosa pine (*Pinus ponderosa*) is present (White Sands Missile Range, 2001).

**Wildlife.** Common mammal species on WSMR include rodents such as the Merriam's kangaroo rat (*Dipodomys merriami*), Ord's kangaroo rat (*Dipodomys ordii*), and deer mouse (*Peromyscus maniculatus*); approximately 20 bat species; carnivorous mammals such as coyote, common gray fox, swift fox (*Vulpes velox*), mountain lion, and bobcat; and ungulates such as mule deer, pronghorn, desert bighorn sheep (*Ovis canadensis mexicana*), elk, feral horse (*Equus caballus*), and oryx (*Oryx gazella*).

The most common birds on WSMR are the black-throated sparrow (*Amphispiza bilineata*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macroura*), and western kingbird (*Tyrannus verticalis*). Other common species include Swainson's hawk (*Buteo swainsoni*), red-tailed hawk, golden eagle, American kestrel (*Falco sparverius*), scaled quail (*Callipepla squamata*), Gambel's quail (*Callipepla gambelii*), and white-winged dove (*Zenaida asiatica*).

The Texas banded gecko (*Coleonyx brevis*), roundtail horned lizard (*Phrynosoma modestum*), checkered whiptail (*Cnemidophorus grahamii*), bullsnake (*Pituophis melanoleucus*), blackneck garter snake (*Thamnophis cyrtopsis*), Plains blackhead snake (*Tantilla nigriceps*), and western diamondback rattlesnake (*Crotalus atrox*) are common reptiles in the majority of habitat types on WSMR.

Common amphibians include tiger salamander (*Ambystoma tigrinum*), Plains spadefoot toad (*Spea bombifrons*), New Mexico spadefoot toad (*Spea multiplicata*), Couch's spadefoot toad (*Scaphiopus couchii*), red-spotted toad (*Bufo punctatus*), green toad (*Bufo debilis*), and Woodhouse toad (*Bufo woodhousii*) (White Sands Missile Range, 2001).

**Threatened and Endangered Species.** Federally listed species for the counties encompassing WSMR are listed in Table 3.4-5.

**Table 3.4-5. Federally Listed Animal Species for the WSMR Area, New Mexico**

Scientific Name	Common Name	Status
<b>Invertebrates</b>		
<i>Dereonectes neomericana</i>	Bonita diving beetle	Special Concern
<i>Lytta mirifica</i>	Anthony blister beetle	Special Concern
<b>Fish</b>		
<i>Cyprinodon tularosa</i>	White Sands pupfish	Special Concern
<b>Birds</b>		
<i>Accipiter gentilis</i>	Northern goshawk	Special Concern
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	Threatened
<i>Charadrius melodus circumcinctus</i>	Piping plover	Threatened
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Falco femoralis septentrionalis</i>	Northern aplomado falcon	Endangered
<i>Sterna antillarum athalassos</i>	Interior least tern	Endangered
<i>Strix occidentalis lucida</i>	Mexican spotted owl	Threatened
<b>Mammals</b>		
<i>Canis lupus baileyi</i>	Mexican gray wolf	Endangered
<i>Cynomys ludovicianus arizonensis</i>	Arizona black-tailed prairie dog	Special Concern
<i>Neotoma micropus leucophaeus</i>	White Sands woodrat	Special Concern
<i>Zapus hudsonius luteus</i>	New Mexico meadow jumping mouse	Candidate

Sources. USFWS, 2009g, h.

### **Sensitive Habitats**

Sensitive habitats on WSMR include wetlands, two plant communities (black grama/longleaf mormon tea habitat and pinyon pine/Scribner needlegrass woodland), cliffs used by nesting raptors, caves and mines used by bats, and the San Andres National Wildlife Refuge which is contained entirely within the boundaries of WSMR and provides habitat for the desert bighorn sheep (White Sands Missile Range, 2001).

#### **3.4.2.7 National Training Center Fort Irwin.**

**Vegetation and Wildlife.** NTC Fort Irwin is located in the Mojave Desert of California. The installation is in the area encompassed by the R-2508 Complex. The vegetation and wildlife of the Mojave Desert are described in Section 3.4.2.1 R-2508 Complex.

**Threatened and Endangered Species.** Threatened and endangered species for NTC Fort Irwin are included in the list of threatened and endangered species for the R-2508 Complex (Table 3.4-1).

**Sensitive Habitats.** Sensitive habitats on NTC Fort Irwin include springs which are a valuable resource to most resident and migratory bird species, lakebeds



which often contain standing water after heavy rains and are used by shorebirds, and steep rocky cliffs used by hawks and falcons for nesting sites (Calibre, 2006).

#### **3.4.2.8 Marine Corps Air Station Yuma.**

**Vegetation.** MCAS Yuma and its associated ranges are located within the Lower Colorado Valley subdivision of the Sonoran Desert, the largest and most arid portion of the desert. Vegetation in the region consists of drought-tolerant shrubs, grasses, and cacti. The most common is creosote bush found in widespread stands or mixed with ocotillo (*Fouquieria splendens*), bursage, teddy bear cactus (*Opuntia bigelovii*), and foothills paloverde (*Cercidium microphyllum*). Sandy soils support big galleta grass plant communities along with foothill paloverde, honey mesquite (*Prosopis glandulosa*), or bursage. Hillsides support brittlebush in combinations with cactus including saguaro (*Cereus giganteus*). Foothills and mountains provide habitat for mixed shrubs. Desert washes and channels support trees and shrubs including paloverde, ironwood (*Olneya tesota*), smoke tree (*Dalea spinosa*), mesquite, and catclaw acacia (*Acacia greggii*). Exposed rocky slopes provide habitat for saquaro and other cactus species, agaves, beargrass, and paloverde (U.S. Army, 2001).

**Wildlife.** Wildlife in the area include desert bighorn sheep, mule deer, coyote, kit fox, gray fox, ringtail (*Bassariscus astutus*), badger (*Taxidea taxus*), spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*), mountain lion, bobcat, and at least 16 species of bats (U.S. Army, 2001).

**Threatened and Endangered Species.** Federally listed threatened and endangered species for La Paz and Yuma counties, Arizona, and Imperial County, California, are provided in Table 3.4-6. The Barry Goldwater Range supports two federally listed animals, Sonoran pronghorn antelope (*Antilocapra americana sonoriensis*) and lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). The species of primary concern in the Chocolate Mountain Ranges is the desert tortoise (Department of the Navy, 2006). The flat-tailed horn lizard (*Phrynosoma mcallii*) is a species of concern that is found on the Barry Goldwater Range. It is being managed by a multiservice conservation agreement intended to keep the species from becoming endangered.

**Sensitive Habitats.** Sensitive habitats include sand dunes, mountain ranges, wildlife watering sites, desert washes, and abandoned mines and natural caves (U.S. Army, 2001).

The Kofa NWR underlies a portion of the Kofa Range. The refuge encompasses 665,400 acres of pristine desert that is home to the desert bighorn sheep and the California fan palm, the only native palm in Arizona. Approximately 800 to 1,000 bighorn sheep live in the refuge (USFWS, 2009k).

The Cabeza Prieta NWR is adjacent to the Barry Goldwater Range and underlies a portion of the R-2301W airspace. The refuge contains 860,010 acres and is home to the endangered Sonoran pronghorn and lesser long-nosed bat. Cabeza

**Table 3.4-6. Federally Listed Animal Species MCAS Yuma Ranges Area, Arizona and California**

Scientific Name	Common Name	Status	AZ <sup>(2)</sup>	CA <sup>(3)</sup>
<b>Fish</b>				
<i>Cyprinodon macularis</i>	Desert pupfish	Endangered	X	X
<i>Gila elegans</i>	Bonytail chub	Endangered	X	X
<i>Poeciliopsis occidentalis occidentalis</i>	Gila topminnow	Endangered	X	
<i>Ptychocheilus lucius</i>	Colorado squawfish	Endangered		X
<i>Xyrauchen texanus</i>	Razorback sucker	Endangered	X	X
<b>Reptiles</b>				
<i>Gopherus agassizii</i>	Desert tortoise	Threatened		X
<b>Birds</b>				
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate	X	X
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered	X	X
<i>Haliaeetus leucocephalus</i>	Bald eagle	Threatened <sup>(1)</sup>	X	
<i>Pelecanus occidentalis</i>	Brown pelican	Endangered	X	X
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered	X	X
<i>Sternula (Sterna) antillarum brownie</i>	California least tern	Endangered		X
<i>Vireo bellii pusillus</i>	Least Bell's vireo	Endangered		X
<b>Mammals</b>				
<i>Antilocapra americana sonoriensis</i>	Sonoran pronghorn	Endangered	X	
<i>Leptonycteris curasoae yerbabuenae</i>	Lesser long-nosed bat	Endangered	X	
<i>Ovis canadensis</i>	Peninsular bighorn sheep	Endangered		X
<i>Panthera onca</i>	Jaguar	Endangered		X

Notes: <sup>(1)</sup> Delisted 2007; threatened status reinstated for desert nesting birds.

<sup>(2)</sup> La Paz and Yuma Counties

<sup>(3)</sup> Imperial County

Sources: USFWS, 2009a, b, c.

Prieta NWR harbors as many as 420 plant species and more than 300 kinds of wildlife (USFWS, 2009l).

### 3.4.3 Deployment Demonstration Locations

The preferred locations for deployment demonstrations are Alpena CRTC, Edwards AFB, Eglin AFB, MCAGCC Twentynine Palms, MCAS Yuma, NAS Lemoore, NAWCWD Point Mugu Ranges, and Volk Field ANGB. Biological resources at Edwards AFB, MCAS Yuma Ranges, and NAWCWD Point Mugu Ranges are discussed in the preceding sections. As discussed in Section 1.4, based on the limited scope and duration of the proposed deployment demonstration activities, no significant impacts are expected. Because of the minimal potential for deployment demonstrations to have a significant adverse impact on biological resources, the discussion of biological resources for the remaining preferred deployment demonstration locations (Alpena CRTC, Eglin AFB, MCAGCC Twentynine Palms, NAS Lemoore, and Volk Field ANGB) is limited to a list of the animal species listed under the federal ESA that have the potential to occur in the counties containing these installations. These species do not necessarily occur on or near the installations.

### 3.4.3.1 Alpena Combat Readiness Training Center.

**Table 3.4-7. Federally Listed Animal Species for Alpena County, MI**

Scientific Name	Common Name	Status
<i>Charadrius melodus</i>	Piping plover	Endangered
<i>Sistrurus catenatus catenatus</i>	Eastern massasauga	Candidate
<i>Somatochlora hineana</i>	Hine's emerald dragonfly	Endangered

Source: USFWS, 2009e.

### 3.4.3.2 Eglin Air Force Base.

The two locations relevant to JSF IOT&E activities at Eglin AFB, the Main Base and Duke Field, are both located in Okaloosa County, Florida.

**Table 3.4-8. Federally Listed Animal Species for Okaloosa County, FL**

Scientific Name	Common Name	Status
<b>Invertebrates</b>		
<i>Fusconaia escambia</i>	Narrow pigtoe (mussel)	Candidate
<i>Hamiota australis</i>	Southern sandshell (mussel)	Candidate
<i>Villosa choctawensis</i>	Choctaw bean (mussel)	Candidate
<b>Fish</b>		
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	Threatened
<i>Etheostoma okaloosae</i>	Okaloosa darter	Endangered
<b>Reptiles and Amphibians</b>		
<i>Ambystoma cingulatum</i>	Flatwoods salamander	Threatened
<i>Caretta caretta</i>	Loggerhead turtle	Threatened
<i>Chelonia mydas</i>	Green turtle	Endangered
<i>Dermochelys coriacea</i>	Leatherback turtle	Endangered
<i>Drymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Eretmochelys imbricata imbricata</i>	Hawksbill turtle	Endangered
<i>Lepidochelys kempii</i>	Kemp's ridley turtle	Endangered
<b>Birds</b>		
<i>Calidris canutus</i>	Red knot	Candidate
<i>Charadrius melodus</i>	Piping plover	Threatened
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered
<b>Mammals</b>		
<i>Peromyscus polionotus allopheys</i>	Choctawhatchee beach mouse	Endangered
<i>Trichechus manatus latirostris</i>	West Indian manatee	Endangered

Source: USFWS, 2008b.

### 3.4.3.3 Marine Corps Air Ground Combat Center Twentynine Palms.

**Table 3.4-9. Federally Listed Animal Species for San Bernardino County (Desert Portion only), CA**

Scientific Name	Common Name	Status
<i>Bufo californicus</i>	Arroyo toad	Endangered
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Gila bicolor mohavensis</i>	Mohave tui chub	Endangered
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<i>Gymnogyps californianus</i>	California condor	Endangered
<i>Vireo bellii pusillus</i>	Least Bell's vireo	Endangered

Source: USFWS, 2009d.

### 3.4.3.4 Naval Air Station Lemoore.

**Table 3.4-10. Federally Listed Animal Species for Kings County, CA**

Scientific Name	Common Name	Status
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	Threatened
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	Threatened
<i>Lepidurus packardii</i>	Vernal pool tadpole shrimp	Endangered
<i>Ambystoma californiense</i>	California tiger salamander (central population)	Threatened
<i>Rana aurora draytonii</i>	California red-legged frog	Threatened
<i>Gambelia (=Crotaphytus) sila</i>	Blunt-nosed leopard lizard	Endangered
<i>Thamnophis gigas</i>	Giant garter snake	Threatened
<i>Gymnogyps californianus</i>	California condor	Endangered
<i>Dipodomys ingens</i>	Giant kangaroo rat	Endangered
<i>Dipodomys nitratoideis exilis</i>	Fresno kangaroo rat	Endangered
<i>Dipodomys nitratoideis nitratoideis</i>	Tipton kangaroo rat	Endangered
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Endangered

Source: USFWS, 2009i.

### 3.4.3.5 Volk Field Air National Guard Base.

**Table 3.4-11. Federally Listed Animal Species for Juneau County, WI**

Scientific Name	Common Name	Status
<i>Canis lupus</i>	Gray wolf	Endangered
<i>Grus americanus</i>	Whooping crane	Non-essential Experimental Population
<i>Sistrurus catenatus catenatus</i>	Eastern massasauga	Candidate
<i>Lycaeides melissa samuelis</i>	Karner blue butterfly	Endangered

Source. USFWS, 2009j.

### 3.5 ENVIRONMENTAL JUSTICE

EO 12898, Environmental Justice, was issued by the President on February 11, 1994. Objectives of the EO, as it pertains to this EA/OEA, include development of federal agency implementation strategies and identification of low-income and minority populations potentially affected because of proposed federal actions. Accompanying EO 12898 was a Presidential Transmittal Memorandum referencing existing federal statutes and regulations to be used in conjunction with EO 12898. One of the items in this memorandum is the use of the policies and procedures of NEPA. Specifically, the memorandum indicates that,

*“Each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 U.S.C. section 4321 et. seq.”*

In addition to environmental justice issues are concerns pursuant to EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

Although an environmental justice analysis is not mandated by NEPA, DOD has directed that NEPA will be used as the primary mechanism to implement the provision of the EO.

**Demographic Analysis.** EO 12898 provides no guidelines for determination of concentrations of low-income or minority populations. Demographic information from the U.S. Bureau of the Census reports both ethnicity and household income status. Minority populations included in the census are identified as Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and other Pacific Islander, or some other race. U.S. Census Bureau poverty status is used in this EA/OEA to define low-income status. Poverty status is reported for families with income below poverty level (defined in the 2000 census a \$16,895 for a family of four with two children under 18 years in 1999).

Youth populations, for consideration of EO 13045, are defined as persons under the age of 18.

## 4.0 ENVIRONMENTAL CONSEQUENCES

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This chapter presents the results of the analysis of potential environmental effects of implementing the JSF IOT&E activities. Changes to the natural and human environments that may result from the JSF IOT&E were evaluated relative to the existing environment, as described in Chapter 3.0. For each environmental component, anticipated direct and indirect effects were assessed. The potential for significant environmental consequences was evaluated using the context and intensity considerations, as defined in CEQ regulations for implementing the procedural provisions of NEPA (40 CFR Part 1508.27).

### 4.1 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the JSF IOT&E program would not be conducted. Activities associated with basing F-35 aircraft at Edwards AFB for IOT&E would not occur. IOT&E pilot training and proficiency flights and flight testing of F-35s would not occur at the R-2508 Complex; NAWCWD China Lake; NAWCWD Point Mugu Ranges; NTTR; UTTR; WSMR; NTC Fort Irwin; or MCAS Yuma Ranges. Because JSF IOT&E activities would not occur, current range activities would continue at these locations. Therefore, the No-Action Alternative assumes a continuation of current activities at these locations.

Deployment demonstration activities would not occur at any of the preferred locations (i.e., Alpena CRTC, Edwards AFB, MCAGCC Twentynine Palms, MCAS Yuma, NAS Lemoore, NAWCWD Point Mugu Ranges, and Volk Field ANGB) or any other suitable locations listed in Appendix C.

Overall, the No-Action Alternative would have negligible environmental effects. No project-related air emissions or noise would be generated, and no impacts to biological resources would occur.

### 4.2 PROPOSED ACTION

#### 4.2.1 Air Quality

JSF IOT&E activities would be conducted in two blocks (Block 2 and Block 3 of the System Development and Demonstration) that are anticipated to occur from mid 2012 to mid 2014. A total of 16 and 20 F-35 aircraft would be based at Edwards AFB during Block 2 and Block 3, respectively.

Aircraft engines emit pollutants during all phases of operation, whether idling on the ground or in flight. However, only those emissions emitted below the atmospheric mixing layer would have a potential air quality impact on ground-level ambient concentrations. The mixing layer is the air layer between the ground and the height above where the vertical mixing of pollutants decreases significantly. The U.S. EPA recommends that a default mixing layer of 3,000 feet (ft) be used in aircraft emission calculations (U.S. EPA, 1992). Therefore, aircraft emissions released above this mixing height are considered to have no impact to

ground level ambient air quality condition. Although the test and training flights would occur along various training routes and within various range complexes, the altitude of these flights would be well above 3,000-ft altitude with negligible air quality effects.

This air quality impact analysis was conducted using an estimate of F-35 operational emissions below 3,000-ft altitude. These operational emissions include criteria pollutant emissions that occur on an annual basis at each site. A subsequent general conformity applicability analysis is included where applicable.

#### **4.2.1.1 Edwards Air Force Base.**

The proposed pilot training, proficiency and test flights that would occur on test ranges would originate and terminate at Edwards AFB. Therefore, this estimate is based on the proposed number of based F-35 aircraft and sorties, and the annual F-35 operational emissions potentially occurring around Edwards AFB. In order to include emissions estimate for the operation of GSE and maintenance engine test cells, the emissions data available for F-16, a jet that uses the similar GSE, were used. These estimates were made using the following emission factor models or documents:

- Departure and arrival engine emission factors for F-35 as provided by the JSF Program Office (September 17, 2008).
- Sortie-associated GSE emission factors established for F-16 in FAA Emissions and Dispersion Modeling System (EDMS, Version 4.0).
- Basing aircraft maintenance engine test cell emission factors established for F-22 in Air Force Air Conformity Applicability Model (ACAM, Version 4.3) given their similar type of engines between F-22 and F-35 and availability of F-22 engine test data associated with the number of basing aircraft.
- Basing personnel associated vehicular emission factors established by USEPA Mobile 6 emission factor model that were built into ACAM (Version 4.3).

A detailed methodology for the estimates and emissions calculations is presented in Appendix A. Table 4.2-1 summarizes the total emissions, including emissions from flight operations, aircraft test cell operations and GSE operations.

The emissions from the deployment demonstration that would occur at Edwards AFB in 2012 are included in Table 4.2-1 in order to show total emissions that would occur as a result of JSF IOT&E at Edwards AFB.

Since approximately five percent of total flying time on each range would occur at or below 3,000 ft, in-flight emissions from five percent of total sortie hours per location were estimated using the JSF Program Office-provided engine emission factors. These predicted emissions are summarized in Table 4.2-2.

**Table 4.2-1.Total Emissions at Edwards AFB**

Block	Pollutant (tons/year)				
	CO	NO <sub>x</sub>	SO <sub>2</sub>	VOC	PM <sub>10</sub>
2	124.55	28.66	2.42	8.29	12.77
3	148.98	54.74	5.02	9.61	27.60

**Table 4.2-2.Total Emissions within Test Range Areas**

Site	Block	Pollutant (tons/year)				
		CO	NO <sub>x</sub>	SO <sub>2</sub>	VOC	PM <sub>10</sub>
R-2508 Complex	2	0.2	0.9	0.1	0.0	0.6
	3	0.3	1.8	0.0	0.2	1.3
NAWCWS China Lake	2	0.1	0.3	0.0	0.0	0.2
	3	0.2	0.9	0.0	0.0	0.6
NTTR	2	0.1	0.4	0.1	0.0	0.3
	3	0.2	0.9	0.1	0.0	0.6
UTTR	2	0.1	0.4	0.1	0.0	0.3
	3	0.2	1.2	0.1	0.0	0.8
WSMR	2	0.0	0.0	0.0	0.0	0.0
	3	0.0	0.0	0.0	0.0	0.0
NTC Fort Irwin	2	0.0	0.1	0.0	0.0	0.0
	3	0.0	0.1	0.0	0.0	0.1
MCAS Yuma Ranges	2	0.1	0.5	0.1	0.0	0.4
	3	0.2	0.8	0.1	0.0	0.6
NAWCWD Point Mugu Ranges	2	0.0	0.2	0.0	0.0	0.2
	3	0.1	0.6	0.1	0.0	0.4

**4.2.1.2 Test Ranges.**

The emissions from the deployment demonstration that would occur on ships in the Point Mugu Sea Ranges are included in Table 4.2-2 in order to show total emissions that would occur as a result of JSF IOT&E at the Point Mugu Sea Ranges.

**4.2.1.3 Deployment Demonstration Locations.**

Deployment Demonstrations consist of temporary deployments of the F-35 aircraft from Edwards AFB to other locations. Currently, the identified preferred locations include: Alpena CRTC, Edwards AFB, Eglin AFB, MCAGCC Twentynine Palms, MCAS Yuma, NAS Lemoore and Volk Field ANGB. Emissions with the potential to occur at these deployment demonstration sites (Table 4.2-3) are calculated for both F-35 flight operations and GSE operations using the same emission factor models described previously for Edwards AFB emissions estimates. Air emissions resulting from the deployment demonstration activities that would occur at Edwards AFB and on the NAWCWD Point Mugu Sea Ranges are included in the total emissions for those locations as shown in Tables 4.2-1 and 4.2-2, respectively.



**Table 4.2-3.Total Emissions at Deployment Demonstration Locations**

Site	Block	Pollutant (tons/year)				
		CO	NO <sub>x</sub>	SO <sub>2</sub>	VOC	PM <sub>10</sub>
Alpena CRTC	3	0.0	0.2	0.0	0.0	0.1
Eglin AFB/Duke Field	2	0.1	0.4	0.0	0.0	0.2
MCAGCC Twentynine Palms	3	0.1	1.2	0.0	0.0	0.5
MCAS Yuma	3	0.1	0.8	0.0	0.0	0.3
NAS Lemoore	3	1.1	1.0	0.0	0.0	0.6
Volk Field ANGB	2	0.1	0.4	0.0	0.0	0.2
	3	0.2	1.1	0.0	0.1	0.6

#### **4.2.1.4 General Conformity Applicability Determination.**

Under the general conformity rule, emissions associated with all operational and construction activities resulting from a proposed federal action, both direct and indirect, must be quantified and compared to annual *de minimis* (threshold) levels for those pollutants for which the project area is in nonattainment.

Direct emissions are emissions of a criteria pollutant or its precursors that are caused or initiated by a federal action, and occur at the same time and place as the action. Indirect emissions are emissions occurring later in time, and/or further removed in distance from the action itself.

NAAQS does not provide a *de minimis* level for CO<sub>2</sub> nor is it included as a criteria pollutant. Therefore general conformity rule does not apply to CO<sub>2</sub> emissions.

The activities that have potential to emit pollutants are those related to F-35 operations at various applicable locations as identified in Table 3.2-2.

Under the general conformity rule, total emissions resulting from proposed federal actions must be compared to the applicable *de minimis* levels on an annual basis. If the emissions of a criteria pollutant (or its precursors) do not exceed the *de minimis* level, the federal action is considered to have a minimal air quality impact, and the action is determined to conform for the pollutant under study. Therefore, no further analysis would be necessary. Conversely, if the total direct and indirect emissions of a pollutant are above the *de minimis* level, a formal general conformity determination is required for that pollutant. The applicable *de minimis* levels are summarized in Table 4.2-4 for each site within a nonattainment area.

Based on the overall levels predicted for each affected site shown in Tables 4.2-1 to 4.2-3, the annual nonattainment pollutants emissions were further defined under the general conformity rule requirement. Since the U.S. EPA uses air basins that normally comprise several counties to define a nonattainment area, the worst-case year (i.e., Block 3) emission levels resulting from the proposed action were distributed to individual nonattainment areas where applicable. The

**Table 4.2-4. Applicable De Minimis Threshold**

Installation	Location	Air Basin/Area	NOx	<i>De minimis</i> Level (tons/year) <sup>1</sup>			PM <sub>2.5</sub>
				VOC	PM <sub>10</sub>		
Edwards AFB	Kern Co, CA	Mojave Desert	100	100	100		N/A
<b>Test Ranges</b>							
R-2508 Complex	Kern Co/Los Angeles Co/ San Bernardino Co/Inyo Co, CA	Mojave Desert/ Great Basin Valleys	100	100	70		N/A
NAWCWD China Lake	Kern Co/San Bernardino Co/Inyo Co, CA	Mojave Desert/ Great Basin Valleys	100	100	70		N/A
NTC Fort Irwin	San Bernardino Co, CA	Mojave Desert	100	100	100		N/A
MCAS Yuma Ranges	Imperial Co/Riverside Co, CA	Salton Sea	100	100	100		N/A
	La Paz Co/Yuma Co, AZ	Yuma Planning Area	N/A	N/A	100		N/A
<b>Deployment Demonstration Locations</b>							
MCAGCC Twentynine Palms	San Bernardino Co, CA	Mojave Desert	100	100	100		N/A
MCAS Yuma	Yuma Co, AZ	Yuma Planning Area	N/A	N/A	100		N/A
NAS Lemoore	Fresno Co/Kings Co, CA	San Joaquin Valley	50	50	N/A		100

N/A = not applicable for general conformity applicability analysis

predicted nonattainment emissions with specific nonattainment areas are summarized in Table 4.2-5.

As shown in Table 4.2-5, the emission values for the proposed F-35 operations would not exceed the applicable annual *de minimis* thresholds for each of the nonattainment pollutants within each applicable nonattainment area. Therefore, a formal conformity determination is not required and no significant air quality impact would result from the implementation of proposed action. Additionally, the increase in annual emissions would make up less than 10 percent of the air basin emission inventory. Consequently, the increases in nonattainment pollutants would not be regionally significant.

#### **4.2.1.5 Greenhouse Gas Emissions.**

The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact on global climate change would only occur when proposed GHG emissions combine with GHG emissions from other human activities on a global scale.

Because the NAAQS pertain to ground level air quality in a specific air basin (in California) or area, the analysis for criteria pollutants was done on a location by location basis and only included air emissions below 3,000 feet AGL. However,

**Table 4.2-5. Nonattainment Pollutants Annual Emissions**

Air Basin/Area	Activity Location	Block 3 Emissions (tons per year)			
		NOx	VOC	PM <sub>10</sub>	PM <sub>2.5</sub>
Nonattainment Area 1					
Mojave Desert, Great Basin Valleys, San Joaquin Valley	Edwards AFB	54.7	9.6	27.6	N/A
	MCAGCC Twentynine Palms (Deployment Demonstration)	1.2	0.0	0.5	N/A
	R-2508 Complex	1.8	0.2	1.3	
	NAWCWD China Lake	0.9	0.1	0.6	N/A
	NTC Fort Irwin	0.1	0.0	0.1	N/A
Total		58.7	9.9	30.1	N/A
De Minimis Level		100	100	70	N/A
Area 1 Inventory		285,175	168,338	213,781	N/A
Nonattainment Area 2					
San Joaquin Valley	NAS Lemoore (Deployment Demonstration)	1.0	0.0	N/A	0.6 <sup>1</sup>
De Minimis Level		50	50	N/A	100
Area 2 Inventory		191,151	131,692	N/A	38,070
Nonattainment Area 3					
Salton Sea	MCAS Yuma Ranges	0.8	0.1	0.6	N/A
De Minimis Level		100	100	100	N/A
Area 3 Inventory		12,702	10,987	85,155	N/A
Nonattainment Area 4					
Yuma Planning Area	MCAS Yuma (Deployment Demonstration)	N/A	N/A	0.3	N/A
De Minimis Level		N/A	N/A	100	N/A
Area 4 Inventory		N/A	N/A	68,901	N/A

Note: <sup>(1)</sup> Assumed to be the same as PM<sub>10</sub>.

N/A = not applicable for general conformity applicability analysis

because the impact of greenhouse gases is global, greenhouse gas emissions were analyzed for the entire proposed action. Given the lack of established CO<sub>2</sub> emission factors for many sources, the available F-35 flight operation associated CO<sub>2</sub> emissions were quantified for the proposed action at each applicable basing site, demonstration deployment site, and along each range route with potential to emit from F-35 flight operations. The potential annual CO<sub>2</sub> emissions from all JSF IOT&E F-35 flight activities at all locations and at all altitudes combined are predicted to be:

- Block2: 33,515 tons
- Block3: 73,123 tons

Detailed estimates are presented in Appendix B. In comparison with the 7,879 million tons of CO<sub>2</sub> emissions estimated for the year of 2007 in the U.S. (U.S. EPA, April 15, 2009), the CO<sub>2</sub> emissions from the proposed action during the year of peak activity (Block3) would result in a roughly 0.001 percent increase over the U.S. 2007 CO<sub>2</sub> emissions. This cumulative impact to global climate change would not be significant.

#### 4.2.2 Noise

The human response to changes in noise levels depends on many factors including: the quality of sound, the magnitude of the change, the time of day at which the changes take place, whether the noise is continuous or intermittent, and the individual's ability to perceive the changes. Moreover, human ability to perceive changes in noise levels varies widely with the individual, as do responses to the perceived changes. The average ability of an individual to perceive changes in noise levels is well documented, and is presented in Table 4.2-6.

**Table 4.2-6. Average Ability to Perceive Changes in Noise Levels**

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A "dramatic change"
40	Difference between a faintly audible sound and a very loud sound

Source: Federal Highway Administration, June 1995.

Generally, a 3-dBA or smaller change in noise levels is barely perceptible to most listeners, whereas, a 10-dBA change is normally perceived as a doubling (or halving) of noise levels. Given these guidelines the direct estimation of an individual's probable perception of changes in noise levels is obtainable.

Because the effect of aircraft noise on sensitive land uses is considered using the metric DNL, or CNEL in California, the criteria for determining the potential aircraft noise impact in airport communities include the following FAA guidance:

- If outdoor DNL (or CNEL) is above 65 dBA, residential land uses are normally considered not compatible. The extent of land areas and populations exposed to DNL (or CNEL) of 65 dBA and higher provides one way of assessing the noise impacts of alternative aircraft actions.
- The proposed action would be found to have no significant noise impact over noise sensitive areas if it would result in an increase less than 1.5 dBA within the 65-dBA DNL (or CNEL) contour. Alternatively, if the proposed action results in an increase in the 65-dBA DNL (or CNEL) contour area that is less than 17 percent (equivalent to approximately 1-dBA increase in CNEL), no significant noise impact would occur.

Under the proposed action, 20 F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities at multiple locations. The activities would also include deployment demonstrations, which consist of temporary deployments of F-35 aircraft and personnel from Edwards AFB to other locations.

Table 4.2-7 shows the number of F-35 sorties for basing and deployment demonstration activities.

**Table 4.2-7. F-35 Sorties by Location**

Airfield Name	State	Proposed Activity	Variant	Sorties	
				Block 2	Block 3
Edwards AFB	California	Deployment Demonstration	F-35A	24	
Eglin AFB/Duke Field	Florida	Deployment Demonstration	F-35B	24	
Volk Field ANGB	Wisconsin	Deployment Demonstration	F-35A	34	92
MCAGCC Twentynine Palms	California	Deployment Demonstration	F-35B		63
MCAS Yuma	Arizona	Deployment Demonstration	F-35B		40
NAS Lemoore	California	Deployment Demonstration	F-35C		120
Alpena CRTC	Michigan	Deployment Demonstration	F-35A		6
Alpena CRTC	Michigan	Deployment Demonstration	F-35B		6
Edwards AFB	California	Basing	All	1,856	4,055

Based on the noise impact analysis described below, the proposed action would not result in significant noise impacts at the basing and demonstration deployment sites, as well as on the training ranges.

#### **4.2.2.1 Edwards Air Force Base.**

The 2005 baseline condition noise model discussed in Section 3.2 was modified to include the additional F-35 aircraft flight operations under the proposed action. The noise model established for the proposed condition is discussed in detail in Appendix A. During Block 3, 4,055 F-35 sorties would occur at Edwards AFB. These would account for 9,110 operations. Compared to the existing 44,415 annual military operations at the base (based on tower counts for 2007), F-35 IOT&E operations would result in a 20.5 percent increase in military operations at Edwards AFB.

Figure 4.2-1 (Edwards AFB Proposed Block 2 CNEL Noise Contours) and Figure 4.2-2 (Edwards AFB Proposed Block 3 CNEL Noise Contours) show that future noise contours are similar to, but slightly greater than, the 2005 baseline condition noise contours (Figure 3.2-1). The expansion of CNEL contours occurring under the proposed action is due to the increase of F-35 operations. Table 4.2-8 shows the acreage of each contour area under the worst-case proposed Block 3 condition. An approximate 18 percent increase in the 65-dBA CNEL contour area was predicted, resulting in a slightly greater area than the



#### EXPLANATION

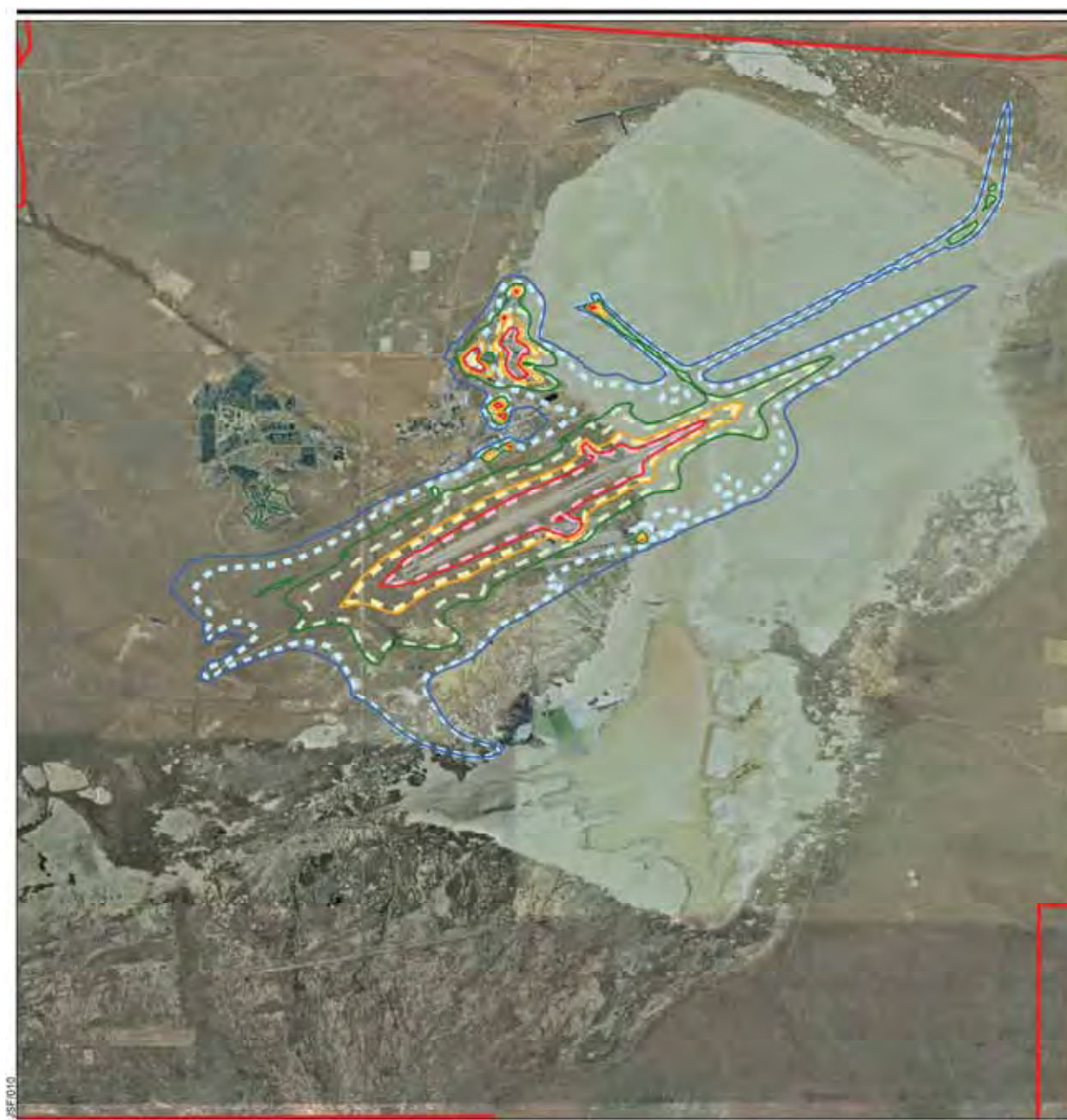
Block 2	Baseline	
80 dB	80 dB	Base Boundary
75 dB	75 dB	
70 dB	70 dB	
65 dB	65 dB	

**Edwards AFB Proposed  
Block 2 Contours**



**Figure 4.2-1**





EXPLANATION		
Block 3	Baseline	
<span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span> 80 dB	<span style="border: 1px dashed red; display: inline-block; width: 15px; height: 10px;"></span> 80 dB	<span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span> Base Boundary
<span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px;"></span> 75 dB	<span style="border: 1px dashed orange; display: inline-block; width: 15px; height: 10px;"></span> 75 dB	
<span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> 70 dB	<span style="border: 1px dashed green; display: inline-block; width: 15px; height: 10px;"></span> 70 dB	
<span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span> 65 dB	<span style="border: 1px dashed blue; display: inline-block; width: 15px; height: 10px;"></span> 65 dB	

**Edwards AFB Proposed  
Block 3 Contours**



**Figure 4.2-2**

**Table 4.2-8. Noise Contour Areas Edwards AFB**

<b>CNEL Contour (dBA)</b>	<b>Area within Contour (acres) 2005 Existing Condition</b>	<b>Area within Contour (acres) Proposed Block 3 Condition</b>	<b>Change in Area (%)</b>
65-70	6,820	7,685	13
70-75	2,502	3,264	30
75-80	1,065	1,258	18
More than 80	1,085	1,295	19
<b>Total</b>	<b>11,472</b>	<b>13,502</b>	<b>18</b>

screening acreage threshold of 17 percent defined by FAA. However, because the 65-dBA CNEL contours would be entirely within the Edwards AFB boundary and they would not extend to any noise sensitive areas on base, the potential noise impact would not be significant and no mitigation for noise would be necessary.

#### **4.2.2.2 Test Ranges.**

The flight test ranges to be used by F-35 are currently used by existing military aircraft operations. The overflight event noise from the F-35 is expected to be comparable to that from other military jets. The noise level perceived from an F-35 during the military power engine setting condition would be at the same level as that generated from an F-22 overflight event. Table 4.2-9 provides a comparison of the flyover SEL levels predicted at the receiver 1,000 feet under the direct flight path from various military jets. Based on this comparison, the event-related noise levels from F-35 under military power setting conditions are comparable to other jet types, particularly F-22 and F-18, currently operating on the ranges. Therefore, no significant change in noise conditions on the test ranges would be expected.

**Table 4.2-9. Comparison of Overflight SEL (dBA) at 1,000 Feet Under Flight Path**

<b>Aircraft Type</b>	<b>Minimum Power Setting</b>	<b>Difference (compared with F-35 A)</b>	<b>Military Power Setting</b>	<b>Difference (compared with F-35 A)</b>
F-35 A	94	--	121	--
F-22 A	102	8	121	0
F-18 E/F	101	7	119	-2
F-18 C/D	95	1	118	-3
F-15 E	93	-1	116	-5
F-15 A	91	-3	115	-6
F-16 C	89	-5	114	-7



#### 4.2.2.3 Deployment Demonstration Locations.

Edwards AFB is proposed as both the main base location for F-35 aircraft during IOT&E and for deployment demonstration. The noise analysis for both of these activities is presented in Section 4.2.2.1. All other deployment demonstrations consist of temporary deployment of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Table 4.2-9 shows these F-35 flight operations relative to existing total airfield and military flight operations at these sites. The total airport and military operational data was obtained from the following sources:

- Airport Master Record (FAA, 2009)
- Operational level provided in the NOISEMAP model input data
- Aircraft Noise Study for NAS Lemoore (Wyle, 2008).

A flight operation represents either a departure or arrival operation. Therefore the total flight operations at each deployment site (Table 4.2-10) are essentially twice the amount of sorties shown in Table 4.2-7. Based on the worst-case year (Block 3 for all sites except Eglin AFB) percentage change over the existing military aircraft operations (less than 3.4 percent), it is anticipated that the existing airfield DNL noise conditions would essentially remain the same under the proposed condition, given such small fractional increases. Such prediction can be further concluded with a comparison of the percentage change in operation (20.5 percent) and associated increase in 65 dBA CNEL contour areas (18 percent) at Edwards AFB (Table 4.2-10). As a result, a detailed noise modeling is not warranted.

**Table 4.2-10. F-35 Flight Operations Comparison**

<b>Airfield</b>	<b>Additional F-35 Flight Operations Block 3</b>	<b>Existing Total Aircraft Operations</b>	<b>Existing Military Aircraft Operations</b>	<b>Net Increase in Military Aircraft Operations (%)</b>
Alpena CRTC <sup>(1)</sup>	24	15,595	3,831	0.6
Eglin AFB/Duke Field <sup>(1)(4)</sup>	48	126,060	90,000	0.1
MCAGCC Twentynine Palms <sup>(2)</sup>	126	4,753	4,753	2.7
MCAS Yuma <sup>(1)</sup>	80	121,642	61,645	0.1
NAS Lemoore <sup>(3)</sup>	240	178,904	177,449	0.1
Volk Field ANGB <sup>(2)</sup>	184	5,569	5,373	3.4

Notes: <sup>(1)</sup> Federal Aviation Administration airport master record for 2007 operations.  
<sup>(2)</sup> Baseline NOISEMAP model input.  
<sup>(3)</sup> Aircraft Noise Study for NAS Lemoore, September 2008.  
<sup>(4)</sup> Block 2

However, it should be noted that F-35 flight operation generates similar noise levels as compared to other military jets particularly as compared to the jet types such as F-22 A, F-18 E/F and F-18 C/D under the military power setting condition

(see Table 4.2-9). The differences among these jet types are within 3 dBA, which is a barely perceptible change in noise (Table 4.2-6). Therefore, it is expected that the F-35 operational event noise would be similar to that from an F-22 or F-18 flight which are currently occurring at many of the deployment sites. Therefore, the proposed deployment demonstrations would slightly increase the overall frequency of aircraft flight noise event at each site, but with a barely perceptible noise increase in each flight event.

At those sites with no current F-22 or F-18 operations, F-35 noise could be readily noticeable under the military power settings with an event noise increase in the range of 5 to 7 dBA. However, given the limited number of sorties at each site, the short-duration F-35 flight operations would unlikely result in a significant noise impact at each site.

### **4.2.3 Biological Resources**

The Proposed Action could affect biological resources from noise generated by aircraft and from visual exposure to aircraft, and from weapons missions. As discussed in the following subsections, no significant impacts to biological resources are expected. All weapons missions would occur at existing test sites; no new roads, targets, or facilities would be built. Because no ground-disturbing activities would occur, no impacts to vegetation are expected. Therefore, this analysis focuses on potential impacts to animals from aircraft activity and weapons missions.

#### **4.2.3.1 Edwards Air Force Base.**

Potential impacts to biological resources from JSF IOT&E activities at Edwards AFB could occur primarily from noise generated during take-off and landing at the Edwards AFB airfield. No significant impacts to biological resources are expected. Impacts from F-35 overflights in the R-2508 Complex, which encompasses Edwards AFB, are discussed in Section 4.2.3.2.

As indicated in the noise analysis in Section 4.2.2.1, noise contours at the Edwards AFB airfield would increase over baseline conditions due to an increase in F-35 operations under the Proposed Action. Wildlife in the vicinity of the Edwards AFB airfield are expected to be acclimated to routine flightline activities and noise levels (Air Force Flight Test Center, 1997). The increase in noise that would occur as a result of the Proposed Action is not considered significant under FAA noise criteria. No significant impacts to wildlife at Edwards AFB are expected to occur.

#### **4.2.3.2 Test Ranges.**

Potential impacts to biological resources in the test ranges could occur from F-35 aircraft overflights. Aircraft noise and visual exposure to aircraft present the potential to affect animals in the test range areas. No significant impacts to biological resources are expected. Potential impacts from weapons missions are discussed by the test range locations where these activities would occur.

Noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout test ranges at subsonic and supersonic levels and is recognized as a routine component of military activities. Although range flight activities may have the potential to impact wildlife, many species have shown an ability to acclimate to high noise levels, including sonic booms. This finding is supported by research conducted by the U.S. Air Force (1999) on the effects of jet noise from aircraft, including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft-related noise exposure and do not exhibit significant adverse effects related to their hearing, behavior, or heart rate. Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout ranges where aircraft operations occur. Therefore, impacts from range flight operations are considered less than significant (Naval Air Weapons Station, 2004).

F-35 aircraft flying activities would adhere to all existing range restrictions including minimum heights AGL, aircraft overflight restricted areas, supersonic flight areas, and temporal restrictions. Therefore JSF IOT&E activities would not present a new impact to wildlife, but would be consistent with the existing environment for these potential impacts to wildlife on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the MRTFB. Similar test activities would be conducted at the MRTFB and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Therefore, overall range activity would not be expected to change significantly under the Proposed Action. Although, as indicated in Section 4.2.2.3, overflight noise from the F-35 is expected to be the loudest of the military jets, the level perceived would be similar to that generated from an existing F-22 overflight event. The increase of event noise, as compared to F-22, would be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected.

#### **4.2.3.2.1 R-2508 Complex.**

Potential impacts to biological resources in the R-2508 Complex from F-35 aircraft overflights would be the same as discussed above. No significant impacts to biological resources are expected. No weapons missions are proposed for the R-2508 Complex, except on NAWCWD China Lake. Potential impacts from weapons missions proposed for NAWCWD China Lake are discussed in Section 4.2.3.2.2.

#### **4.2.3.2.2 Naval Air Warfare Center Weapons Division China Lake.**

Potential impacts to biological resources at NAWCWD China Lake from F-35 overflights would be similar to those discussed for the Test Ranges in Section 4.2.3.2. No significant impacts to biological resources are expected. JSF IOT&E activities proposed for NAWCWD China Lake also include air-to-ground weapons

releases and aerial target launches and air-to-air live missile shots. Air-to-ground releases would entail use of both inert and live weapons. Aerial targets would be launched from NAWCWD China Lake. All target launches and weapons releases would use existing facilities and established target ranges.

The U.S. Navy prepared an EIS in 2004 to analyze the environmental impacts of increasing the tempo of military test and evaluation and operational training activities conducted at Naval Air Weapons Station (now NAWCWD) China Lake. The activities addressed in this EIS included the use of target and test sites. The proposed action includes an approximately 25 percent increase in the tempo of target and test sites and associated ordnance use over 5 years. The EIS findings are that continued use of target and test sites and the proposed increase in operations would have less than significant impacts on threatened and endangered species and species/habitats warranting NAWCWD stewardship. Proposed operations are not expected to result in adverse impacts to designated critical habitat or to the goals and objectives of the installation's Desert Tortoise Habitat Management Plan. Potential impacts to desert tortoise would remain below a level of significance through continued compliance with the terms of the 1995 Biological Opinion. Target and test sites are not located in Mojave tui chub or Inyo California towhee habitat. Impacts would be less than significant (Naval Air Weapons Station, 2004).

Under JSF IOT&E, a total of 53 air-to-ground releases and 5 aerial target launches and air-to-air live missile shots would be conducted at NAWCWD China Lake. These activities would use the existing targets and test sites. Based on the findings of the 2004 EIS, the minimal weapons missions that would occur at NAWCWD China Lake as part of JSF IOT&E would not be expected to result in significant environmental impacts to biological resources.

#### **4.2.3.2.3 Naval Air Warfare Center Weapons Division Point Mugu.**

JSF IOT&E activities proposed for the Point Mugu Ranges include F-35 overflights and two ship-based deployment demonstrations. Airborne noise in the Sea Range is created by subsonic and supersonic flight activity of aircraft, aerial targets, and missiles. Same as for the overland test ranges, noise sources associated with the Proposed Action would be consistent with these existing noise sources. Existing activities on the Point Mugu ranges were analyzed in the EIS/Overseas EIS Pt Mugu Sea Range (Department of the Navy, 2002). This document concluded that impacts to biological resources from range activity, including those from aircraft, missile, and target overflight, ship operations, and debris from weapons missions, would not be significant.

JSF IOT&E activities proposed for the Point Mugu Ranges also include a total of four air-to-ground weapons releases and 22 aerial target launches and air-to-air live missile shots. Current air-to-air operations on the Sea Range involve high-altitude aircraft operations, launch of targets from NAWCWD Point Mugu, target debris falling into the ocean, occasional intact missiles or targets impacting the ocean, and possibly target recovery using a helicopter. These activities were analyzed in the EIS/OEIS Pt Mugu Sea Range (Department of the Navy, 2002). The EIS/OEIS findings are that impacts of these activities on biological resources

in the Sea Range are less than significant. No significant impacts to wildlife from the Proposed Action would be expected.

#### **4.2.3.2.4 Nevada Test and Training Range.**

Potential impacts to biological resources at NTTR from F-35 overflights would be similar to those discussed for the Test Ranges in Section 4.2.3.2. No significant impacts to biological resources are expected. The USFWS programmatic Biological Opinion, issued on June 17, 2003, concluded that training activities at NTTR would not jeopardize the continued existence of the desert tortoise or destroy or adversely modify critical habitat (U.S. Air Force Air Combat Command, 2008a). JSF IOT&E activities proposed for NTTR also include three air-to-ground weapons releases. Air-to-ground releases would entail use of inert weapons. Under the proposed action, F-35s would use existing target areas on NTTR for ordnance delivery. Air-to-ground releases are a long-term training activity conducted at NTTR. The weapons releases proposed as part of JSF IOT&E would not be any different from the current weapons releases conducted at NTTR. As part of this ongoing activity, they would be conducted in accordance with conditions of the programmatic Biological Opinion for the desert tortoise. In 1995, 1,944 inert targets were released on the NTTR. The three releases that would occur as part of the proposed action would be a minimal percentage of total weapons currently being released on the range. The 1999 Renewal of the Nellis Air Force Range Land Withdrawal Legislative EIS analyzed ongoing range activities and stated that adverse impacts to the tortoise and its habitat would occur on a limited portion of the NTTR South Range that is used for air-to-ground weapons training. However, it concluded that impacts to desert tortoises would be insignificant (Department of the Air Force, 1999). The weapons releases that would be conducted for JSF IOT&E would be part of ongoing range activities that were addressed and analyzed in the EIS. All existing procedures in place for the protection of natural resources on the NTTR for weapons releases and use of target sites would be adhered to for JSF IOT&E activities. The three air-to-ground releases of inert weapons on existing target areas would not be expected to have a significant impact to biological resources on the NTTR.

#### **4.2.3.2.5 Utah Test and Training Range.**

Potential impacts to biological resources at UTTR from F-35 overflights would be similar to those discussed for the Test Ranges in Section 4.2.3.2. No significant impacts to biological resources are expected. No federally listed threatened and endangered species are known to be present on the UTTR. U.S. Air Force fighters currently fly 90 percent of the total sorties flown on the UTTR on an annual basis (Department of the Air Force, 2008). F-35 aircraft activity would be consistent with current jet fighter activity on the range. JSF activities proposed for UTTR also include a total of five aerial target launches and air-to-air live missile shots. Use of existing target launch sites and target areas would not be expected to have a significant impact on biological resources on the UTTR. The impacts to vegetation and wildlife, including threatened and endangered species, at UTTR from continued airspace use by fighter and bombers, and from air-to-air and air-to-ground training exercises, including weapons delivery at target complexes, were analyzed in a range management plan and EA (Dames and Moore Foster

Wheeler Environmental Corporation, 1997). The EA findings are that no significant adverse environmental effects would occur from these activities. The Air Force documented the operations and environmental conditions at the UTTR as of December 31, 2007 and concluded that conditions were the same as described in the 1997 EA and therefore the findings of that EA are still current (U.S. Air Force, 2008).

#### **4.2.3.2.6 White Sands Missile Range.**

Similar to the situation at the other test range locations, potential impacts to biological resources from the proposed JSF IOT&E activities at WSMR would be limited to those from F-35 aircraft overflights and from weapons missions. No significant impacts to biological resources are expected. JSF IOT&E activities proposed for WSMR would be similar to those that would occur at WSMR as part of the JSF DT. DT activities proposed for WSMR and analyzed in the DT EA/OEA entail a higher level of activity at WSMR than would occur under IOT&E. DT activities proposed for WSMR include more aircraft flights than would occur as part of IOT&E. A maximum of 23 F-35 sorties would occur during one year under DT versus a maximum of 10 F-35 sorties under IOT&E. DT also includes more air-to-air missile tests, and more target (drone) launches than proposed for IOT&E. A total of 8 to 11 aerial target launches and air-to-air live missile shots would occur under DT versus a total of 5 under IOT&E. DT activities are expected to occur during a three-year time frame at WSMR. IOT&E activities would occur over two years. As currently scheduled, the years of DT activities and the years of IOT&E activities proposed for WSMR would not overlap.

Impacts to biological resources at WSMR were analyzed in the DT EA/OEA. The DT EA/OEA concluded that biological species are expected to already be acclimated to the noise generated from ongoing activities conducted at WSMR. Air-to-air missile programs and target system launches are routine activities at WSMR. No significant impacts to biological/natural resources were expected over the three-year test period for the proposed JSF DT Program. Based on the similar nature of IOT&E activities and the lower activity level during a shorter time frame, no significant impacts to biological resources from IOT&E activities at WSMR would be expected.

#### **4.2.3.2.7 National Training Center Fort Irwin.**

Potential impacts to biological resources at NTC Fort Irwin from F-35 overflights would be similar to those discussed for the Test Ranges in Section 4.2.3.2. No weapons missions are proposed for NTC Fort Irwin. No significant impacts to wildlife from the Proposed Action would be expected.

#### **4.2.3.2.8 Marine Corps Air Station Yuma Ranges.**

Potential impacts to biological resources at MCAS Yuma Ranges from F-35 overflights would be similar to those discussed for the Test Ranges in Section 4.2.3.2. No weapons missions are proposed for the MCAS Yuma Ranges. No significant impacts to wildlife from the Proposed Action would be expected.

#### **4.2.3.3 Deployment Demonstration Locations.**

The Proposed Action would result in a temporary increase in noise levels at the airfields at each deployment demonstration location. As indicated in Section 4.2.2.2, the increased loudness of noise events is expected to be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected at the deployment demonstration locations.

#### **4.2.4 Environmental Justice**

Under the Proposed Action there would be no significant impacts to resources; therefore, there would not be any adverse effects to disproportionately high minority, low-income, or youth populations. No significant environmental justice impacts would occur.

### **4.3 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS**

Initial analysis indicated that the JSF IOT&E activities would not result in short- or long-term significant impacts to socioeconomics, airspace, land use, aesthetics, transportation, utilities, hazardous materials management, geology and soils, water resources, and cultural resources. The resources analyzed in more detail are air quality, noise, biological resources, and environmental justice.

Air emissions from F-35 IOT&E activities would be *de minimis* and not regionally significant, therefore, the Proposed Action would conform to the applicable SIP for nonattainment areas. Noise levels at the Edwards AFB airfield would increase due to F-35 take-offs and landings during IOT&E. This increase in noise levels would not exceed the significance threshold established by the FAA. Noise produced by the F-35 is expected to be comparable to that from other jet fighters currently operating on the test ranges. The proposed deployment demonstrations would slightly increase the overall frequency of aircraft flight noise events at each site, but with a barely perceptible noise increase in each flight event. The Proposed Action would not present the potential for any impacts to vegetation. The proposed JSF IOT&E activities would be consistent with existing, ongoing activities at the test ranges. Wildlife on the ranges is expected to be acclimated to these routine activities. Therefore, there would be no significant unavoidable adverse environmental effects from implementation of the F-35 IOT&E-phase activities.

### **4.4 COMPATIBILITY OF THE PROPOSED ACTION WITH OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL LAND USE PLANS AND POLICIES**

The Proposed Action does not entail any activity that would result in a change in land use. No significant impacts to existing land uses from aircraft overflight noise levels and sonic booms would occur.

#### **4.5 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY**

The Proposed Action would not affect the long-term productivity of the environment, because no significant adverse environmental impacts are anticipated.

#### **4.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

Irreversible and irretrievable commitment of resources would occur in the form of jet fuel and other petroleum products that would be consumed during use.

#### **4.7 CUMULATIVE ENVIRONMENTAL CONSEQUENCES**

Cumulative impacts result from the “incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over periods of time” (Council on Environmental Quality, 1978).

A review of reasonably foreseeable future actions presenting a potential for generating cumulative impacts in association with JSF IOT&E activities was conducted. The analysis covered programs and activities that are currently scheduled, that are not accounted for in the baseline conditions as described in Section 3.0 of this EA/OEA, and projected funded programs or activities.

As stated in Section 1.2, JSF test activities would not be additive to the total operations currently conducted at the MRTFB. Similar test activities would be conducted at the MRTFB and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Dedicated testing is one of the reasons the MRTFB was created. There is limited potential for JSF activities to be additive if range operations capacity has not been attained when the range space scheduling request is received.

The Air Force proposes to beddown (base) 36 F-35 fighter aircraft and to implement a force development evaluation program and a weapons school at Nellis AFB, Nevada. Because this activity would entail F-35 flight activity on the NTTR starting in 2012, it would overlap with the two test years of the JSF IOT&E 2013 and 2014. Under the beddown project, F-35 activity on the NTTR would begin in 2012 and increase until it reaches a maximum of 8,460 sorties (51,840 sortie-operations) in 2022. The maximum IOT&E activity at NTTR would be 700 sorties (4,200 sortie-operations) in 2014. The number of beddown sorties for 2014 are not defined; however, 2014 would be the 3rd year of the beddown activity and peak beddown activity would not be reached for 8 more years. Also, only 6 F-35s, out of the final total of 36 aircraft, would be based at Nellis AFB that year. Therefore, the maximum F-35 beddown activity that would occur in 2014 would be expected to be approximately a quarter to a third of the maximum activity level in 2022. The combined total of IOT&E sorties plus the beddown sorties that would occur in 2014 on the NTTR is expected to be far less than the maximum beddown activity alone by 2022. The EIS prepared for the F-35



beddown at Nellis AFB did not identify any significant environmental impacts from the maximum beddown activity on the NTTR (U.S. Air Force Air Combat Command, 2008a). The cumulative impacts of the IOT&E and beddown activity on NTTR would therefore also be expected to be less than significant.

No other activities that could contribute to cumulative impacts with JSF IOT&E activities were identified; therefore, no cumulative environmental impacts have been identified.

## 5.0 CONSULTATION AND COORDINATION

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### Federal Agencies

#### Department of Defense

Michigan Air National Guard  
U.S. Air Force, Edwards AFB  
U.S. Air Force, Eglin AFB  
U.S. Air Force, Nellis AFB  
U.S. Air Force, Hill AFB  
U.S. Army, NTC Fort Irwin  
U.S. Army, WSMR  
U.S. Marine Corps, MCAGCC Twentynine Palms  
U.S. Marine Corps, MCAS Yuma  
U.S. Navy, NAS Lemoore  
U.S. Navy, NAWCWD China Lake  
U.S. Navy, NAWCWD Point Mugu  
Wisconsin Air National Guard

#### Department of Interior

National Marine Fisheries Service Southwest Regional Office  
USFWS, Carlsbad Field Office, California  
USFWS, East Lansing Ecological Services Office, Michigan  
USFWS, Green Bay Ecological Services Office, Wisconsin  
USFWS, Nevada Office  
USFWS, New Mexico Ecological Services Field Office  
USFWS, Panama City Field Office  
USFWS, Sacramento Field Office, San Joaquin Valley Branch, California  
USFWS, Southern Nevada Field Office  
USFWS, Tucson Sub Office, Arizona  
USFWS, Utah Ecological Services Field Office  
USFWS, Ventura Field Office, California

### State Agencies

State Historic Preservation Officer, Arizona State Parks  
Office of Historic Preservation, California Department of Parks and Recreation  
Florida Historic Preservation Office  
State Historic Preservation Officer, Michigan Historical Center  
Nevada State Historic Preservation Office  
New Mexico Department of Cultural Affairs, Historic Preservation Division  
State Historic Preservation Officer, Utah State Historical Society  
Wisconsin Historical Society

### American Indian Groups

Blackfeet Tribe  
Chemehuevi Reservation Colorado River Agency  
Cocopah Tribe  
Colorado River Indian Tribes (CRIT) Tribal Council  
Confederated Tribes of the Goshute Indian Reservation

Consolidated Group of Tribes and Organizations (representing the following tribes: Benton Paiute, Big Pine Paiute, Bishop Paiute, Chemehuevi, Colorado River Indian Tribes, Duckwater Shoshone, Ely Shoshone, Fort Independence, Fort Mojave, Kaibab Band of Southern Paiutes, Las Vegas Paiute, Lone Pine Paiute-Shoshone, Moapa Band of Paiutes, Pahrump Paiute, Paiute Indian Tribes of Utah, Timbisha Shoshones, and Yomba Shoshone)

Crow Tribe of Montana

Eastern Shoshone Tribe

Fort Yuma Quechan Tribe

Hopi Tribe

Morongo Band of Mission Indians, Southern California Agency

Navajo Tribe

Northern Arapaho Tribe

Northwestern Band of the Shoshone Nation

Paiute Indian Tribe of Utah

Pueblo of Zuni

San Juan Southern Paiute Tribe

San Manuel Band of Mission Indians

Shoshone-Bannock Tribes of the Fort Hall Reservation

Shoshone-Paiute Tribes of the Duck Valley Reservation

Skull Valley Band of Goshute Indian

Te-Moak Tribe of Western Shoshone Indians

Ute Indian Tribe

Ute Mountain Ute Tribe

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## 7.0 DISTRIBUTION

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### Federal Agencies

#### Department of Defense

Michigan Air National Guard  
U.S. Air Force, Edwards AFB  
U.S. Air Force, Eglin AFB  
U.S. Air Force, Nellis AFB  
U.S. Air Force, Hill AFB  
U.S. Army, NTC Fort Irwin  
U.S. Army, WSMR  
U.S. Marine Corps, MCAGCC Twentynine Palms  
U.S. Marine Corps, MCAS Yuma  
U.S. Navy, NAS Lemoore  
U.S. Navy, NAWCWD China Lake  
U.S. Navy, NAWCWD Point Mugu  
Wisconsin Air National Guard

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USFWS, East Lansing Ecological Services Office, Michigan  
USFWS, Green Bay Ecological Services Office, Wisconsin  
USFWS, Nevada Office  
USFWS, New Mexico Ecological Services Field Office  
USFWS, Panama City Field Office  
USFWS, Sacramento Field Office, San Joaquin Valley Branch, California  
USFWS, Southern Nevada Field Office  
USFWS, Tucson Sub Office, Arizona  
USFWS, Utah Ecological Services Field Office  
USFWS, Ventura Field Office, California

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Arizona Department of Environmental Quality  
State Historic Preservation Officer, Arizona State Parks  
California State Clearinghouse  
Office of Historic Preservation, California Department of Parks and Recreation  
Florida State Clearinghouse  
Florida Historic Preservation Office  
Michigan Department of Environmental Quality  
State Historic Preservation Officer, Michigan Historical Center  
Nevada Division of Environmental Protection  
Nevada State Historic Preservation Office  
New Mexico Environment Department  
New Mexico Department of Cultural Affairs, Historic Preservation Division  
Utah Department of Environmental Quality  
State Historic Preservation Officer, Utah State Historical Society  
Wisconsin Department of Natural Resources, Environmental Protection  
Wisconsin Historical Society

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Hopi Tribe  
Morongo Band of Mission Indians, Southern California Agency  
Navajo Tribe  
Northern Arapaho Tribe  
Northwestern Band of the Shoshone Nation  
Paiute Indian Tribe of Utah  
Pueblo of Zuni  
San Juan Southern Paiute Tribe  
San Manuel Band of Mission Indians  
Shoshone-Bannock Tribes of the Fort Hall Reservation  
Shoshone-Paiute Tribes of the Duck Valley Reservation  
Skull Valley Band of Goshute Indian  
Te-Moak Tribe of Western Shoshone Indians  
Ute Indian Tribe  
Ute Mountain Ute Tribe

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## **APPENDIX A**

### **NOISE IMPACT MODELING - EDWARDS AIR FORCE BASE**



## **A.1 Introduction**

To estimate noise levels at Edwards Air Force Base (AFB), Community Noise Equivalent Level (CNEL) contours in increments of 65, 70, 75, and 80 A-weighted decibels (dBA) were produced using computer-modeling techniques. Noise modeling was completed for the proposed average-daily conditions under both the Joint Strike Fighter (JSF) F-35 Block 2 and Block 3 implementation periods. The following sections describe the methods and considerations used in compiling input data for BaseOps and NOISEMAP calculations which are used to predict the proposed condition's noise contours, and the analysis of those contours.

## **A.2 Computerized Noise Exposure Models**

The analysis of noise exposure from the JSF F-35 aircraft and compatibility with land uses around Edwards AFB is accomplished using a group of computer-based programs known as NOISEMAP. The NOISEMAP suite of computer programs was developed by the U.S. Air Force. The NOISEMAP suite of computer programs consists of BASEOPS (Version 7.32), Omega10, Omega11, NMAP, NMPLLOT (Version 4.96), and Noisefile. Noisefile is a noise database that includes noise information for most aircraft models. The BASEOPS program accommodates several data entry types including: runway coordinates; airfield information; flight tracks; distinct aircraft flight profiles (powers, altitudes, and speeds) occurring along each track; number of flight operations; run-up coordinates; run-up profiles; and run-up operations. The OMEGA10 program extrapolates/interpolates the SELs for each aircraft model from the Noisefile database, and considers the specified speeds; engine thrust settings; and environmental conditions appropriate to each type of flight operation. The OMEGA11 program calculates maximum A-weighted sound levels for each aircraft model; taking into consideration the engine thrust settings and environmental conditions appropriate to run-up operations. The core NOISEMAP program incorporates the number of daytime, nighttime, and/or evening time operations, flight paths, and profiles of the aircraft to calculate DNL or CNEL at many points on the ground around the facility. Finally, the NMPLLOT program draws contours of equal DNL or CNEL for overlay onto land-use maps.

## **A.3 Aircraft Operations**

To develop the noise contours, data from several sources are utilized, including the proposed JSF F-35 flight operations, and the baseline condition NOISEMAP(2005) input data as incorporated for the *Joint Strike Fighter System Development and Demonstration Developmental Test Program Final Environmental Assessment/Overseas Environmental Assessment*. The proposed F-35 flight sortie operations were combined with the baseline conditions to develop noise contours under the proposed condition. A sortie is an aircraft mission event that includes a completed departure and return to the base. The total annual F-35 sortie operations at Edwards AFB are presented in Table A-1.

**Table A-1. Total F-35 Sortie Operations at Edwards AFB**

Activity	Block 2	Block 3
Deployment Demonstrations	24	-
Total Basing Sorties	1,856	4,055

F-35 noise contours occurring under the proposed action were modeled for both Block 2 (includes Deployment Demonstrations (DD) at Edwards AFB) and Block 3 (maximum annual operations). To develop noise contours, NOISEMAP requires information on the number of operations occurring on a daily basis. Average-daily F-35 aircraft flight operations information for Edwards AFB was developed from average-annual aircraft flight operations, based on 260 annual operating days.

#### **A.4 Flight Track Utilization**

Flight tracks are graphical representations of aircraft flight paths shown in relation to the ground. The FAA describes these depictions in the Aeronautical Information Manual (AIM) explaining that a flight track is, “the actual flight path of an aircraft over the surface of the earth.” Aircraft are free to travel many paths, unlike other forms of transportation which are normally limited to the confines of a roadway, railway, or waterway. Despite this operational freedom, pilots need to align their aircraft with runways and adhere to specific procedures to take-off and land from an airport. Alignment procedures concentrate aircraft flight tracks in the immediate vicinity of airports minimizing the possible number of flight tracks.

The flight track used for Edwards AFB, when it is used as a DD site, was developed from a similar flight track in which Edwards AFB is treated as a separate facility for takeoff and landing. For consideration of F-35 maximum annual flight operations the existing F-22 flight track data at Edwards AFB, as presented in the NOISEMAP baseline condition input data, was used. In order to fit the flight track to specific F-35 flight profiles, specific flight track distances for F-22 were altered. However, the general alignment and turning points of the track remain unchanged. F-22 flight tracks that are not defined in a similar way to F-35 flight profiles are not considered in the analysis. The flight track information and utilization is shown in Table A-2.

#### **A.5 Flight Profiles, Noise, and Climatic Data**

F-35 flight profiles were obtained from *Detailed Description of F-35A/B/C Flight Profiles, US Air Force, US Navy and US Marine Corps, Airfield Noise Studies*. For each flight track, the distance along the track; altitude; power setting; and airspeed were entered into the NOISEMAP computer model. The types of flight profiles used for each track type are presented in Table A-3.

**Table A-2. F-35 Flight Track Utilization at Edwards AFB**

Activity	Track	Track Type	Runway	Annual Sorties	% Total Sorties	Percentage per Track Type				Operations per Track Type			Operations		
						Total	Day-time	Evening	Night-time	Annual	Daily <sup>(1)</sup>	Total	Day-time	Evening	Night-time
EDWARDS AFB as a DD Site, Block 2	12D1	Interfacility	12L	24	100%	100%	100%	0.00%	0.00%	24	0.0923	0.0923	0.0923	0.0	0.0
Maximum Annual Operations at Edwards AFB, Block 2	22A4	Arrival	22	1,856	85%	17.04%	98.99%	1.01%	0.00%	1,578	6.068	1.904	1.885	0.019	0.0
	22A7	Arrival	22			11.37%	98.87%	1.13%	0.00%			1.342	1.327	0.015	0.0
	22A6	Arrival	22			26.48%	99.03%	0.97%	0.00%			1.270	1.258	0.012	0.0
	22A3	Arrival	22			39.70%	99.03%	0.97%	0.00%			1.342	1.329	0.013	0.0
	04A2	Arrival	04			3.22%	98.67%	1.33%	0.00%			0.105	0.104	0.001	0.0
	04A1	Arrival	04			2.19%	98.04%	1.96%	0.00%			0.105	0.103	0.002	0.0
	22D1	Departure	22		85%	9.49%	98.99%	0.00%	1.01%	1,578	6.068	0.577	0.571	0.0	0.006
	22D1	Departure	22			38.00%	99.00%	0.00%	1.00%			2.305	2.282	0.0	0.023
	22D2	Departure	22			9.49%	98.99%	0.00%	1.01%			0.577	0.571	0.0	0.006
	22D2	Departure	22			38.00%	99.00%	0.00%	1.00%			2.305	2.282	0.0	0.023
	04D1	Departure	04			1.01%	98.81%	0.00%	1.19%			0.062	0.061	0.0	0.001
	04D1	Departure	04			4.00%	99.00%	0.00%	1.00%			0.243	0.240	0.0	0.002
	22C1	Closed Pattern	22		15%	95.00%	98.99%	1.01%	0.00%	278	1.071	1.017	1.007	0.010	0.0
	04C1	Closed Pattern	04			5.00%	99.20%	0.80%	0.00%			0.054	0.053	0.0004	0.0
Maximum Annual Operations at Edwards AFB, Block 3	22A4	Arrival	22	4,055	85%	17.04%	98.99%	1.01%	0.00%	3,447	13.258	4.160	4.118	0.042	0.0
	22A7	Arrival	22			11.37%	98.87%	1.13%	0.00%			2.932	2.899	0.033	0.0
	22A6	Arrival	22			26.48%	99.03%	0.97%	0.00%			2.775	2.748	0.027	0.0
	22A3	Arrival	22			39.70%	99.03%	0.97%	0.00%			2.932	2.903	0.029	0.0
	04A2	Arrival	04			3.22%	98.67%	1.33%	0.00%			0.229	0.226	0.003	0.0
	04A1	Arrival	04			2.19%	98.04%	1.96%	0.00%			0.229	0.225	0.004	0.0
	22D1	Departure	22		85%	9.49%	98.99%	0.00%	1.01%	3,447	13.258	1.260	1.248	0.0	0.013
	22D1	Departure	22			38.00%	99.00%	0.00%	1.00%			5.035	4.985	0.0	0.050
	22D2	Departure	22			9.49%	98.99%	0.00%	1.01%			1.260	1.248	0.0	0.013
	22D2	Departure	22			38.00%	99.00%	0.00%	1.00%			5.035	4.985	0.0	0.050
	04D1	Departure	04			1.01%	98.81%	0.00%	1.19%			0.135	0.133	0.0	0.002
	04D1	Departure	04			4.00%	99.00%	0.00%	1.00%			0.530	0.525	0.0	0.005
	22C1	Closed Pattern	22		15%	95.00%	98.99%	1.01%	0.00%	608	2.339	2.222	2.200	0.022	0.0
	04C1	Closed Pattern	04			5.00%	99.20%	0.80%	0.00%			0.117	0.116	0.001	0.0

Note: (1) Average over 260 operating days per year



**Table A-3. F-35 Flight Profiles**

Activity	Track	Track Type	Runway	F-35 Flight Profile
EDWARDS AFB as a DD Site, Block 2	12D1	Interfacility	12L	Mil Takeoff, Mil Climb and Straight-in Arrival
Maximum Annual Operations at Edwards AFB, Block 3	22A4	Arrival	22	Pitch-out Arrival
	22A7	Arrival	22	Straight-in Arrival
	22A6	Arrival	22	Pitch-out Arrival
	22A3	Arrival	22	Straight-in Arrival
	04A2	Arrival	04	Pitch-out Arrival
	04A1	Arrival	04	Straight-in Arrival
	22D1	Departure	22	Max Afterburner Takeoff then Mil Climb
	22D1	Departure	22	Mil Takeoff, Mil Climb
	22D2	Departure	22	Max Afterburner Takeoff then Mil Climb
	22D2	Departure	22	Mil Takeoff, Mil Climb
	04D1	Departure	04	Max Afterburner Takeoff then Mil Climb
	04D1	Departure	04	Mil Takeoff, Mil Climb
	22C1	Closed Pattern	22	Touch and Go Pattern
	04C1	Closed Pattern	04	Touch and Go Pattern

## A.6 Noise Contours

Using the data described above, NOISEMAP calculated and plotted the 65-dBA through 80-dBA CNEL contours that would occur as a result of the average-daily flight operations proposed during Block 2 and Block 3 conditions at Edwards AFB. These CNEL contours are shown in Figures 4-1 and 4-2. The baseline condition CNEL contours were also reproduced and are shown in Figure 3-1. Table A-4 summarizes impacts occurring under the proposed action at Edwards AFB, in terms of acreage within contours at 5-dBA increments for the worst-case scenario.

**Table A-4. Proposed Noise Contour Areas**

CNEL Contour (dBA)	Area within Contour (acres)	
	Block 2	Block 3
65-70	7,285	7,685
70-75	3,047	3,264
75-80	1,213	1,258
More than 80	1,208	1,295
Total	12,753	13,502

## **APPENDIX B**

### **AIR EMISSIONS ANALYSIS**



## **B.1 Introduction**

Under the proposed JSF IOT&E operations, criteria pollutants will be emitted through the operation of the following equipment:

- Aircraft engines during arrival, departure, idling, pattern flight, and other operations
- Aircraft ground support equipment (GSE) including tow vehicles, power generators, and other equipment associated with each sortie events
- Aircraft engines during maintenance tests
- Ground vehicles from additional personnel

## **B.2 Aircraft Flight Emissions**

Aircraft sortie-related engine emissions were estimated according to the methodologies described in the following guidance documents:

- The Procedures of Emission Inventory Preparation, Volume IV: Mobile Sources (U.S. EPA, 1992)
- Air Emissions Inventory Guidance Document For Mobile Sources at Air Force Installations (Air Force Base, December 2003)

F-35 flight emission factors, which are applicable to every sortie event stage, were provided by the JSF Program Office (September 17, 2009). The primary event stages occurring during various engine power settings include:

- Engine warm up
- Taxi and hold
- Engine run up
- Acceleration
- Take off
- Approach
- Deceleration
- Touch down
- Taxi in
- Hot refueling

The emission factors provided vary according to the type of F-35 aircraft (F-35A, B, and C) used. However, given that the distributions at Edwards AFB for the three F-35 variants, and the three types of operations for F-35B are unknown, it was assumed that the total sortie numbers are evenly distributed among the three variants. The combined emissions factors per sortie are summarized in Table B-1 for each F-35 aircraft type. These emissions factors were used to determine sortie-related aircraft flight emissions as associated with the based operations occurring at Edwards AFB, and deployment demonstration operations

**Table B-1. F-35 Flight Emission Factors**

Variant	Emissions Factor from Single Sortie (lb/sortie)					
	CO	NO <sub>x</sub>	SO <sub>2</sub>	VOC	PM <sub>10</sub>	CO <sub>2</sub>
F-35A	4.9	20.8	0.2	2.3	13.3	8019.6
F-35B	4.6	36.5	0.2	1.3	14.4	10181.7
F-35C	17.1	14.7	0.2	0.7	9.5	5584.3

at deployment sites. Table B-2 gives a summary of the calculated flight emissions for basing and deployment demonstration aircraft operations.

**Table B.2. F-35 Flight Emission at Edwards AFB and Deployment Sites**

Airfield Name	Block	Sorties	Sortie Emissions (tons/Year)					
			CO	NO <sub>x</sub>	SO <sub>2</sub>	VOC	PM <sub>10</sub>	CO <sub>2</sub>
Edwards AFB	2	1856	4.51	19.33	2.15	0.23	12.36	7442.20
	3	4055	9.84	42.23	4.70	0.49	27.00	16259.75
Deployment Demonstration Sites								
Alpena CRTC	3	12	0.0	0.2	0.0	0.0	0.1	54.6
MCACGC 29 Palms	3	63	0.1	1.2	0.0	0.0	0.5	320.7
MCAS Yuma	3	40	0.1	0.7	0.0	0.0	0.3	203.6
Point Mugu Deployment Sites	3	187	1.0	2.5	0.1	0.0	1.1	758.9
NAS Lemoore	3	120	1.0	0.9	0.0	0.0	0.6	335.1
Volk Field ANGB	2	34	0.1	0.4	0.0	0.0	0.2	136.3
	3	92	0.2	1.0	0.1	0.0	0.6	368.9
Eglin AFB	2	24	0.1	0.4	0.0	0.0	0.2	122.2

The in-flight range operation emission factors were based on available emission factors, which were established for the aircraft cruise mode operating from 10 nautical miles distance and on approach to the airfield. Given that the mix of F-35 aircraft types is unknown within each range area, the F-35A emission factors were used for all sortie hours in each range. Both emissions factors and calculated flight emissions occurring within test range areas are shown for each range in Tables B-3 through B-10. Since only five percent of flight hours would occur below the 3,000 ft mixing height, the percentage (5%) of total sortie hours within each range were defined and used in the criteria pollutants emissions calculation. However, the CO<sub>2</sub> emissions estimated also account for those above 3,000 ft (914 m) mixing height.

**Table B-3. Annual Emissions within for R2508**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	860	43	6023	258989	1.3	7.1	0.1	0.9	5.0	3117.1	0.2	0.9	0.0	0.1	0.6	8072.9
3	1690	85	6023	508944	1.3	7.1	0.1	0.9	5.0	3117.1	0.3	1.8	0.0	0.2	1.3	15864.3

**Table B-4. Total Emissions - China Lake**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	310	16	6023	93357	1.3	7.1	0.1	0.9	5.0	3117.1	0.1	0.3	0.0	0.0	0.2	2910.0
3	800	40	6023	240920	1.3	7.1	0.1	0.9	5.0	3117.1	0.2	0.9	0.0	0.1	0.6	7509.7

**Table B-5. Total Emissions - NTTR**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	410	21	6023	123472	1.3	7.1	0.1	0.9	5.0	3117.1	0.1	0.4	0.0	0.1	0.3	3848.7
3	810	41	6023	243932	1.3	7.1	0.1	0.9	5.0	3117.1	0.2	0.9	0.0	0.1	0.6	7603.6

**Table B-6. Total Emissions - UTTR**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	420	21	6023	126483	1.3	7.1	0.1	0.9	5.0	3117.1	0.1	0.5	0.0	0.1	0.3	3942.6
3	1100	55	6023	331265	1.3	7.1	0.1	0.9	5.0	3117.1	0.2	1.2	0.0	0.1	0.8	10325.9

**Table B-7. Total Emissions - WSMR**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	0	0	6023	0	1.3	7.1	0.1	0.9	5.0	3117.1	0.0	0.0	0.0	0.0	0.0	0.0
3	20	1	6023	6023	1.3	7.1	0.1	0.9	5.0	3117.1	0.0	0.0	0.0	0.0	0.0	187.7

**Table B-8. Total Emissions - NTC Fort Irwin**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	60	3	6023	18069	1.3	7.1	0.1	0.9	5.0	3117.1	0.0	0.1	0.0	0.0	0.0	563.2
3	100	5	6023	30115	1.3	7.1	0.1	0.9	5.0	3117.1	0.0	0.1	0.0	0.0	0.1	938.7

**Table B-9. Total Emissions - MCAS Yuma**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	480	24	6023	144552	1.3	7.1	0.1	0.9	5.0	3117.1	0.1	0.5	0.0	0.1	0.4	4505.8
3	780	39	6023	234897	1.3	7.1	0.1	0.9	5.0	3117.1	0.2	0.8	0.0	0.1	0.6	7322.0

**Table B-10. Total Emissions - NAWCWD Point Mugu**

Block	Total Sortie Hours	5 % Hours (<3,000 ft)	Fuel Flow Rate (lb/hr)	Fuel Used (lbs)	Emission Index (pounds per 1,000 pounds fuel)						Emissions from Single Flight (tons/year)					
					CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>	CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
2	210	11	6023	63242	1.3	7.1	0.1	0.9	5.0	3117.1	0.0	0.2	0.0	0.0	0.2	1971.3
3	540	27	6023	162621	1.3	7.1	0.1	0.9	5.0	3117.1	0.1	0.6	0.0	0.1	0.4	5069.1

### B.3 Ground Support Equipment (GSE) Emissions

Aircraft flight operations require ground support services, which also result in emissions occurring from various types of motorized equipment and diesel-powered ground vehicles such as heaters, generators, loaders, tractor-trailer trucks, etc. In order to quantify these emissions, the most recent version of Federal Aviation Administration (FAA)-developed Emissions and Dispersion Modeling System (EDMS) model (Version 4.0) was used.

U.S. EPA considers the EDMS model to be the “Preferred Guideline” model for use when predicting the air quality impact, and developing the emissions inventory for civil airports and military bases. The EDMS model utilizes default emission factors for the typical GSE types associated with each aircraft operation, including many military aircraft and helicopters. Since F-35 uses the similar group of GSE as F-16, the GSE emissions data available for F-16 in the EDMS model were utilized to approximate F-35 GSE emissions. The GSE emission estimates are summarized in Table B-11 according to each basing and deployment demonstrations site.

**Table B-11 GSE Emissions**

Airfield Name	Block	Sortie	GSE Emissions <sup>(1)</sup> (tons/Year)					
			CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Basing Site								
Edwards AFB	2	1856	0.54	2.14	0.16	0.01	0.13	N/A
	3	4055	1.06	4.23	0.33	0.01	0.25	NA
Deployment Demonstration Sites								
Alpena CRTC	3	12	0.0	0.0	0.0	0.0	0.0	NA
MCACGC 29 Palms	3	63	0.0	0.1	0.0	0.0	0.0	NA
MCAS Yuma	3	40	0.0	0.0	0.0	0.0	0.0	NA
Point Mugu Deployment Sites	3	187	0.0	0.1	0.0	0.0	0.0	NA
NAS Lemoore	3	120	0.0	0.1	0.0	0.0	0.0	NA
Volk Field ANGB	2	34	0.0	0.0	0.0	0.0	0.0	NA
	3	92	0.0	0.1	0.0	0.0	0.0	NA
Eglin AFB	2	24	0.0	0.0	0.0	0.0	0.0	NA

Note: <sup>1)</sup> GSE Emissions were obtained using EDMS.

### B.4 Aircraft Engine Test Cells Emissions and Ground Vehicle Emissions

The U.S. Air Force's Air Conformity Applicability Model (ACAM) is a screening model recommended by the Air Force Center for Environmental Excellence (AFCEE) for use in determining the general conformity applicability for Air Force bases. The ACAM model performs an air conformity applicability analysis with very limited user input requirements, and can be used to predict certain aircraft maintenance-related emissions. In particular, the model can be used to predict emissions from engine test cell operations. ACAM can also be used to predict



ground vehicle emissions from additional on-base personnel associated with the proposed action.

Emissions occurring from aircraft engine test cell operations result from periodic engine testing during each operating mode such as idle (ID), intermediate (IN), approach (AP), military (MI), and afterburner (AB). To account for potential engine test cell emissions occurring at Edwards AFB for basing F-35, the emission factors associated with the F-22 jet basing aircraft were used given its similar aircraft engine type as compared to F-35 and approximated for F-35 engine test cell emissions. The emissions estimated to occur at Edwards AFB are summarized in Table B-12. Table B-12 also provides the emissions resulting from vehicle operation from 425 and 508 additional personnel from Blocks 2 and 3, respectively.

**Table B-12. Engine Test Cell/ Ground Vehicle Emissions at Edwards AFB (tpy)**

Sources	CO	NO <sub>x</sub>	SO <sub>2</sub>	VOC	PM <sub>10</sub>
<b>Engine Test Cell Emissions</b>					
<b>Block2</b>					
Aircraft Engine Test Cells-MI	0.05	1.33	0.07	0.00	0.08
Aircraft Engine Test Cells-IN	0.08	0.45	0.04	0.02	0.05
Aircraft Engine Test Cells-ID	0.32	0.02	0.01	0.05	0.02
Aircraft Engine Test Cells-AP	0.23	0.20	0.03	0.01	0.06
Aircraft Engine Test Cells-AB	0.97	0.44	0.06	0.01	0.00
Total	1.65	2.44	0.21	0.09	0.21
<b>Block3</b>					
Aircraft Engine Test Cells-MI	0.06	1.66	0.08	0.00	0.11
Aircraft Engine Test Cells-IN	0.10	0.56	0.05	0.02	0.06
Aircraft Engine Test Cells-ID	0.40	0.02	0.01	0.06	0.02
Aircraft Engine Test Cells-AP	0.29	0.24	0.04	0.01	0.07
Aircraft Engine Test Cells-AB	1.21	0.55	0.08	0.01	0.00
Total	2.06	3.03	0.26	0.10	0.26
<b>Ground Vehicle Emissions</b>					
<b>Block2</b>					
Mobile-Base Employee Commute VMT	107.27	3.24	0.00	7.02	0.00
Mobile-On Road GOV VMT	8.90	0.81	0.00	0.63	0.00
Off-Road Base Support Vehicles	1.68	0.70	0.05	0.16	0.07
Total	117.85	4.75	0.05	7.81	0.07
<b>Block3</b>					
Mobile-Base Employee Commute VMT	123.73	3.55	0.00	7.79	0.00
Mobile-On Road GOV VMT	10.28	0.85	0.00	0.70	0.00
Off-Road Base Support Vehicles	2.01	0.83	0.06	0.19	0.09
Total	136.02	5.23	0.06	8.68	0.09

### B.5 Total Combined Emissions at Edwards AFB

Total annual emissions at Edwards AFB resulting from the proposed action would include emissions from the operation of aircraft in-flight, deployment demonstrations, GSE, and engine test cells. The total combined annual emissions are summarized in Table B-13.

**Table B-13. Total Combined Emissions at Edwards AFB (tpy)**

Source	Block	CO	NO <sub>x</sub>	SO <sub>2</sub>	VOC	PM <sub>10</sub>	CO <sub>2</sub>
GSE	2	0.54	2.14	0.01	0.16	0.13	NA
	3	1.06	4.23	0.01	0.33	0.25	NA
Test Cell	2	1.65	2.44	0.21	0.09	0.21	NA
	3	2.06	3.05	0.25	0.11	0.26	NA
Flight Emissions	2	4.51	19.33	2.15	0.23	12.36	7442.20
	3	9.84	42.23	4.70	0.49	27.00	16259.75
Ground Vehicle Emissions	2	117.85	4.75	0.05	7.81	0.07	NA
	3	136.02	5.23	0.06	8.68	0.09	NA
Block2 Total Emissions		124.55	28.66	2.42	8.29	12.77	7442.20
Block3 Total Emissions		148.98	54.74	5.02	9.61	27.60	16259.75

### B.6 Deployment Demonstration Site Total Emissions

Total predicted annual emissions occurring at each deployment demonstration site during the proposed action include operational emissions from deployment demonstrations and GSE. The total combined annual emissions excluding Edwards AFB are summarized in Table B-14.

**Table B-14. Total Aircraft Operation and GSE Emissions at Deployment Sites.**

Airfield Name	Block	Sortie	Total Aircraft Operation and GSE Emissions (Tons/Year)					
			CO	NO <sub>x</sub>	HC	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Alpena CRTC	3	12	0.0	0.2	0.0	0.0	0.1	54.6
MCACGC 29 Palms	3	63	0.1	1.2	0.0	0.0	0.5	320.7
MCAS Yuma	3	40	0.1	0.8	0.0	0.0	0.3	203.6
Point Mugu Deployment Sites	3	187	1.0	2.6	0.0	0.1	1.2	758.9
NAS Lemoore	3	120	1.1	1.0	0.0	0.0	0.6	335.1
Volk Field ANGB	2	34	0.1	0.4	0.0	0.0	0.2	136.3
	3	92	0.2	1.1	0.0	0.1	0.6	368.9
Eglin AFB	2	24	0.1	0.4	0.0	0.0	0.2	122.2

## B.7 Total GHG CO<sub>2</sub> Emissions

Total predicted annual CO<sub>2</sub> emissions occurring at each basing and deployment demonstration site including those with various ranges during the proposed action are summarized in Table B-15.

**Table B-15. Total GHG CO<sub>2</sub> Emissions**

<b>Source</b>	<b>CO<sub>2</sub> (tons per year)</b>
<b>Block 2</b>	
Edwards AFB	7,442.2
Deployment Sites	258.5
Ranges	25,814.5
Total	33,515.2
<b>Block 3</b>	
Edwards AFB	16,259.8
Deployment Sites	2,041.8
Ranges	54,821.0
Total	73,122.6

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## **APPENDIX C**

### **JSF IOT&E SITE NARROWING STUDY**



This document identifies and describes the criteria used to narrow a variety of concepts to a set of reasonable alternatives. The following sections present the results of the narrowing process, a description of the general methodology used, the Initial Operational Testing and Evaluation (IOT&E) narrowing process, IOT&E narrowing criteria, an explanation of the results of the narrowing process, and attachments containing the narrowing process data.

### **C1.0 Narrowing Results**

- Main Test Facility (MTF): Edwards Air Force Base (AFB), CA
- Test Ranges: R-2508 Complex, CA; Naval Air Warfare Center Weapons Division (NAWCWD) China Lake Range, CA; NAWCWD Pt Mugu Sea Range, CA; Nevada Test and Training Range (NTTR), NV; Utah Test and Training Range (UTTR), UT; Marine Corps Air Station (MCAS) Yuma Ranges, AZ; White Sands Missile Range (WSMR), NM; and the National Training Center (NTC) Ft Irwin, CA.
- Deployment Demonstration (DD) Forward Operating Location (FOL)/austere (DD-FOL) Sites: Edwards AFB South Base, CA; Twentynine Palms Marine Corps Air Ground Combat Center (MCAGCC), CA; Yuma MCAS, AZ; Lemoore Naval Air Station (NAS), CA; Eglin AFB (Duke Field), FL; and Volk Field, WI
- Deployment Demonstration Cold Weather (DD-CW) Site: Alpena County Regional Airport, MI

### **C2.0 General Methodology**

Narrowing is a process that evaluates an alternative's ability to fulfill the action's purpose and need. It starts with an evaluation of the purpose and need statement. That evaluation culminates in the development of a list of basic requirements or required criteria that a reasonable alternative must satisfy. These requirements can be statutory, regulatory, technical, operational, economic, or environmental. An additional list of desired criteria may be developed to distinguish a preferred alternative from other reasonable alternatives.

Defining "Required Criteria" and "Desired Criteria" is initially performed by the proponent because their knowledge, expertise, and background qualifies them for identifying the basic technical, operational, and economic parameters that must be met in order to satisfy the purpose and need of the program. Other participants in the narrowing process may include members of the legal, engineering, environmental, and health and safety communities to identify statutory, regulatory, environmental, and safety requirements that may take the form of required or desired criteria.

In defining required and desired criteria, we can establish a criteria hierarchy for determining when an alternative can be eliminated outright, those that we need to consider but can eliminate, and those that we must analyze. In short, alternatives that don't meet the purpose and need and those that don't meet the purpose can be eliminated out right. Alternatives that meet the purpose but don't meet the needs should be considered but can be eliminated. Finally, alternatives



that meet both the purpose and most of the needs are analyzed to the same degree that the Proposed Action is.

### **C3.0 IOT&E Narrowing Process**

In applying the general methodology in Section 2, the IOT&E narrowing process begins with an evaluation of the purpose and need statement. A description of the statutes and regulations mentioned in the purpose and need statement can be found in Attachment C-1 to this document, Statutory and Regulatory Excerpts.

The purpose of the action is twofold: (1) to satisfy the statutory and regulatory requirements pursuant to 10 U.S.C. 2399, Department of Defense (DOD) Directive 5000.01, DOD Instruction 5000.02, and DOD Directive 3200.11, and (2) to evaluate the effectiveness, compatibility, and performance of the JSF against other fighters, ground targets, surface targets, and also when providing close air support to ground forces.

The needs of the action pertain to conducting the tests at locations that would facilitate the evaluation of the weapon system.

Satisfying the statutory and regulatory requirements is a required criterion. 10 U.S.C. 2399 mandates the operational test and evaluation of the Joint Strike Fighter (JSF); consequently, there are no other reasonable alternatives. However, the National Environmental Policy Act (NEPA) requires the analysis of the No-Action alternative even if an action is mandated by law. The Council on Environmental Quality (CEQ) defined two types of No-Action Alternatives; one type includes continuing with the present course of action, the second type includes that the proposed action would not take place. Since the low-rate production of the JSF cannot be continued forever, the first type of No-Action Alternative is unreasonable. The second form of the No-Action Alternative, that of not conducting the tests, can be addressed from a comparative perspective and is presented in Section 3, Affected Environment as the baseline conditions and analyzed in Chapter 4, Environmental Consequences in the Environmental Assessment.

A major requirement of DOD Directive 5000.01 and DOD Instruction 5000.02 is the development of a Test and Evaluation Master Plan (TEMP). It identifies the specific tests to be conducted and the evaluative criteria. A TEMP is a living document meaning that it is in a constant state of revision driven by the results obtained from the analysis of completed tests. Due to the nature of the document being under constant revision, it is, in and of itself, an alternative to the previous document.

DOD Directive 3200.11 requires us to consider the use of Major Range and Test Facility Bases (MRTFB). Most of the tests identified in the 2009 TEMP, such as aerial combat against other fighters, attacking ground/surface targets, and providing close air support to ground forces, can be conducted at the MRTFB ranges. However, since the aircraft will be deployed overseas at some point, some testing will need to be conducted at other DOD installations. Those installations would replicate forward operating locations (FOLs), which cannot be

economically duplicated at the MRTFB. In addition, those sites may be used as the opportunity presents itself to take advantage of existing environmental conditions. State-side FOLs are installations that resemble the conditions found at overseas and austere (limited infrastructure and support) sites. The environmental conditions referenced pertain to cold weather conditions.

In summary, conducting the tests at locations that would facilitate the evaluation of the weapons system is a required criterion for which reasonable alternatives can be developed. In essence, four sets of narrowing criteria are needed; one for narrowing the MRTFB Test Ranges, the second for narrowing the MRTFB Main Test Facility, the third for narrowing the DD-FOL Sites, and the fourth for narrowing the DD-CW sites. The following is a description of the Required Criteria, Desired Criteria, and rationale used in the narrowing process.

#### **C4.0 Developing IOT&E Narrowing Criteria**

##### **C4.1 MRTFB Test Range Criteria and Rationale**

###### **C4.1.1 Required Criteria:**

- a) The DOD Test Ranges should be located within Continental United States (CONUS).  
Rationale: To ensure the security of the aircraft, assets, and personnel.
- b) The DOD Test Ranges should have flight test or aerial combat capabilities.  
Rationale: Availability of advanced communication systems and links, data acquisition, reduction, processing, and data verification systems. Aerial combat capabilities include air-to-air, air-to-ground, and in some cases live fire capability.
- c) The DOD Test Ranges should be located within the JSF combat radius of the MTF.  
Rationale: Fuel and support costs and the shorter distance enable the aircraft to spend more time on range

###### **C4.1.2 Desired Criteria:**

- a) The preferred DOD Test Range resources and capabilities should satisfy the Critical Operational Issues (COI) objective.  
Rationale: The COI identifies the type of mission the JSF is evaluated against. In order to effectively test the JSF's COI performance, the Test Range must have the capabilities and resources for conducting the test.
- b) Air-Surface Warfare tests should be conducted on a Sea Range (Navy and Marine variants).  
Rationale: The F-35B (Marine version) and the F-35C (Navy version) will both operate over the ocean. Consequently, the tests must be conducted over a Sea Range to evaluate their capability to operate in an ocean environment.

- c) JSF variant should use service specific DOD Test Range.  
Rationale: While the JSF can be tested at most aerial or air combat range, testing of the F-35A (Air Force variant) at an Air Force Range and testing the F-35B and F-35C at a Naval Range would enable the IOT&E program to take advantage of personnel staffed from the same service thus eliminating potential confusion that might occur when mixing service procedures or terms.
- d) Preferred DOD Test Ranges should be based on the DOD Test Ranges satisfying most of the above.  
Rationale: This enables the IOT&E to take advantage of the economies of scale, allow more time on range, and reduce testing costs.

#### C4.2 MRTFB Main Test Facility Criteria and Rationale

##### C4.2.1 Required Criteria:

- a) The DOD MTF must be located within the CONUS.  
Rationale: To ensure the security of the aircraft, assets, and personnel.
- b) The DOD MTF must be a Flight Test Center (FTC).  
Rationale: Availability of specialized facilities and support systems such as advanced communication and data processing, and the accumulated experience of base and contractor personnel familiar with flight test activities.

##### C4.2.2 Desired Criterion:

- a) The preferred DOD MTF should have the most number of DOD Test Ranges within the JSF's combat radius.  
Rationale: Fuel and support costs. In addition, the shorter distance enables the aircraft to spend more time on range.

#### C4.3 DD FOL Site Criteria and Rationale

##### C4.3.1 Required Criteria:

- a) DD FOL sites should be located at US military or joint use installations with suitable security within the CONUS.  
Rationale: To ensure the security of the aircraft, assets, and personnel.
- b) DD FOL sites should have a minimum runway length of 8,000 feet.  
Rationale: Flight safety. Adequate runway length is needed to protect the aircraft and pilot in the event of an emergency.
- c) DD FOL sites should be installations that the services use for deployment readiness preparation.  
Rationale: Deployment preparation and demonstration installations are those that have been set up to replicate the conditions should be similar to those found at overseas FOLs and austere sites.
- d) DD FOL sites should have adequate ramp space for cargo handling and processing of one to eight C-17s (Ramp space must be able to support one C-17 at a time for delivering and processing of F-35

logistics and support equipment and hold up to less than or equal to eight C-17s worth of F-35 logistics and support equipment.).  
Rationale: The logistics footprint test will need a place for the C-17s to off load cargo and personnel. Airfields with a runway only will not be useable.

- e) DD FOL site runways should be suitable for fighter operations.  
Rationale: Flight safety. Some runway pavements are not of sufficient strength to handle repeated fighter aircraft operations without incurring damage. Loose pavement can damage any aircraft during takeoff or landing.

#### C4.3.2 Desired Criteria:

- a) DD FOL sites should be located to enable the JSF to spend more time on range or is a CRTC.  
Rationale: The shorter travel distance reduces fuel and support costs. CRTCs are set up to replicate the conditions should be similar to those found at overseas FOLs and austere sites for practice and testing.

#### C4.4 DD CW Site Criteria and Rationale

##### C4.4.1 Required Criteria:

- a) DD CW sites must be located at US military or joint use installations with suitable security within the CONUS.  
Rationale: To ensure the security of the aircraft, assets, and personnel.
- b) DD CW sites must have a minimum runway length of 8,000 feet.  
Rationale: Flight safety. Adequate runway length is needed to protect the aircraft and pilot in the event of an emergency.
- c) DD CW sites should be installations the services use for deployment readiness preparation and demonstration.  
Rationale: Deployment preparation and demonstration installations are those that have been set up to replicate the conditions should be similar to those found at overseas FOLs and austere sites.
- d) DD CW sites must have adequate ramp space for cargo handling and processing of one to eight C-17s (Ramp space must be able to support one C-17 at a time for delivering and processing of F-35 logistics and support equipment and hold up to less than or equal to eight C-17s worth of F-35 logistics and support equipment.).  
Rationale: The logistics footprint test will need a place for the C-17s to off load cargo and personnel. Airfields with a runway only will not be useable.
- e) DD CW site runways must be suitable for fighter operations.  
Rationale: Flight safety. Some runway pavements are not of sufficient strength to handle repeated fighter aircraft operations without incurring damage. Loose pavement can damage any aircraft during takeoff or landing.

- f) DD CW sites should be located in states having a winter low temperature average of 0 to 10 degrees Fahrenheit or colder.  
Rationale: The JSF will be stationed at installations subject to cold weather at some point in its lifetime. Consequently, it and the people maintaining it need to be tested under cold weather conditions to ensure its combat effectiveness.

#### C4.4.2 Desired Criteria:

- a) DD CW Sites should be located at Combat Readiness Training Centers (CRTC) because of the compatibility of activities.  
Rationale: CRTCs located in cold weather regions possess the needed infrastructure to support cold weather operations.

### C5.0 Narrowing Results

Several reference documents were used in the narrowing process. Among them, the January 2009 JSF TEMP, Enclosure 2 of the DODD 3200.11, was used to identify the MRTFBs, DODD 3200.11 June 1983 was used to determine the primary missions associated with each MRTFB, Air Mobility Command (AMC) Airfield Suitability and Restrictions Report (ASRR) September 2008 was used to identify airfield characteristics and capabilities, and the National Weather Map for Winter Averages was used to determine cold weather regions.

#### C5.1 Test Range Selection

Using Attachment C-2, Table C5.1-1, MRTFB Missions and Combat Radius, 19 MRTFB sites were evaluated using the required and desired criteria to select the Test Ranges and MTF. Of the 19, 3 were eliminated because they are not located within the CONUS. Another seven were eliminated because they were not mission compatible. In other words the Test Range's primary mission was not related to aircraft testing or activities. One site was eliminated because it was not located within the JSF combat radius of the MTF. While the NTC is not an MRTFB, it was added to the list of potential Test Ranges because it is an ideal location (66 nautical miles from Edwards AFB) for Close Air Support missions for COI 2.

Of these remaining ranges, three were identified as critical to the program. They were the Pt Mugu Sea Range, because of its maritime resources and capabilities, NAWCWD China Lake Range, because of its naval aviation resources and capabilities, and the NTTR, because of its Air Force aviation resources and capabilities (Table C5.1-2). The other ranges may be used as the need presents itself. For example, the UTTR has some of the same resources and capabilities as NTTR. NTTR has better capabilities for supporting the COIs 1, 2, and 4 and it is closer to Edwards AFB offering more time on range. The same can be said of the resources and capabilities of the other Test Ranges.

- Preferred Test Ranges: R-2508 Complex, CA; NAWCWD China Lake Range, CA; NAWCWD Pt Mugu Sea Range, CA; NTTR, NV;
- Alternative Test Ranges: UTTR, UT; MCAS Yuma Ranges, AZ; WSMR, NM; and the NTC Ft Irwin, CA.

## C5.2 Main Test Facility Selection

Attachment C-2, Table C5.1-1, MRTFB Missions and Combat Radius, was used to narrow the selection for the Main Test Facility. Two FTCs qualified as MTFs but Edwards AFB, CA, is identified as the preferred MTF because it satisfied the desired criteria C4.2.2 a). Naval Air Test Center Patuxent River was eliminated because there were no other Test Ranges located within its JSF combat radius. The following is a quick summary of the narrowing results:

- Preferred MTF: Edwards AFB, CA

## C5.3 DD FOL Site Selection

Attachment C-2, Table C5.3-1, Deployment Demonstration Site Narrowing, was used to narrow the selection for the FOLs. The evaluation of suitable DD sites began with assessing AMC's ASRR list of over 1,000 runways within the CONUS. Based on the required criteria presented in Section C4.3.1 a), that list was reduced to 208 sites. The list was further reduced to 169 sites by focusing on sites with runways 8,000 feet or longer. Using criteria C4.3.1 c) reduced the list to 104 sites. The narrowing process then focused on sites capable of handling the C-17 and fighter type aircraft (criteria C4.3.1 d) and C4.3.1 e)). The evaluation resulted in 100 sites being identified as suitable.

At that point the evaluation focused on identifying preferred locations based on time-on-range or if the installation was a CRTIC. Criterion 4.3.2 a) was applied to reduce potential sites from 100 to 36 sites. Further narrowing was accomplished by identifying representative FOLs, including service specific locations. For example, Alpena County Regional Airport, MI, and Volk Field, WI, have facilities specifically designed for DOD personnel to use as training sites prior to deployment into a combat area of operations. The list of 36 was further reduced to 6 preferred sites.

- Preferred DD-FOL Sites: Edwards AFB South Base, CA; Twentynine Palms MCAGCC, CA; Yuma MCAS, AZ; Lemoore NAS, CA; Eglin AFB (Duke Field), FL; and Volk Field, WI

## C5.4 DD CW Site Selection

Attachment C-2, Table C5.3-1, Deployment Demonstration Site Narrowing, was also used to narrow the selection for the CW sites. Evaluation of CW sites began with 100 sites, and then narrowed the sites based on climate. Cold weather region was defined as temperatures ranging from 0 degrees Fahrenheit to 10 degrees Fahrenheit or colder during the winter. Applying the temperature criteria reduced the list from 100 sites to 6 sites. Of these six sites, two sites were identified as satisfying the desired criteria: Volk Field WI and Alpena County Regional Airport MI. Alpena is the preferred alternative because the temperature and humidity at that location will provide optimal cold weather stress on the weapon system.

- Preferred DD-CW Site: Alpena County Regional Airport, MI

## **ATTACHMENT C-1: STATUTORY AND REGULATORY DESCRIPTION**

Section C3.0, IOT&E Narrowing Process, referenced 10 U.S.C. 2399, DOD Directive 5000.01 and DOD Instruction 5000.02, and DOD Directive 3200.11 as being relevant to the required criteria used in the narrowing process. The following is a short description of the applicable portions.

10 U.S.C. 2399 defines operational test and evaluation and limits the production of the weapon systems to low-rate production levels until the initial OT&E (IOT&E) is completed. It also prohibits testing based exclusively on computer modeling and simulations. IOT&E must be conducted in an operationally realistic combat environment and the Director of Operational Test and Evaluation of the DOD must submit a report at the conclusion of operational test and evaluation to the Secretary of Defense, the Under Secretary of Defense for Acquisition, Technology, and Logistics, and the congressional defense committees indicating whether the results of such test and evaluation confirm that the items or components actually tested are effective and suitable for combat before the program can proceed beyond low rate initial production.

DOD Directive 5000.01 and DOD Instruction 5000.02 establish the framework of the acquisition process. Every DOD system is developed from an ORD that describes the desirable objectives the system should meet and the key performance parameters (KPP). The ORD also defines the technical and operational thresholds the system must meet. DOD Instruction 5000.02 also mandates taking full advantage of existing DOD ranges, facilities, and other resources in the planning and execution of the test. Based on this, the consideration of MRTFB locations is one of the key criteria in support of the purpose and need for the Proposed Action. This instruction also requires the development of a TEMP. Specific system performance activities are developed by AFOTEC in consultation with the Marines and the Navy. The F-35 variants' performance tests include, but are not limited to, the ability to attack, provide air support, conduct reconnaissance, and conduct sortie generation (ability to launch, recover, reload, and launch again and again) which are evaluated against the technical parameters established in the TEMP. It is common for test parameters to change as the test results are analyzed and as the test program evolves.

DOD Directive 3200.11 lists the ranges and bases established to conduct test and evaluation of various weapon systems. They are presented in Enclosure 2 of the directive and in Attachment C-2, Table C5.1-1 MRTFB Missions and Combat Radius. The selection and use of MRTFB supports the JSF Program Office's purpose of assessing the operation of the F-35 in a variety of realistic combat conditions based on technical specifications, operating criteria, and unique Service (U.S. Navy, U.S. Air Force, U.S. Marine Corps, and UK Royal Navy and Royal Air Force) mission requirements. Note: JSF test activities would not be additive to the total operations currently conducted at the MRTFB. Similar test activities would be conducted at the MRTFB, and JSF, being a higher priority user, would replace lower priority activity during IOT&E, as necessary. The major difference would be the type of aircraft or system using MRTFB resources. Dedicated testing is one of the reasons the MRTFB was created. There is limited potential for JSF activities to be additive if range operations capacity has not been attained when the range space scheduling request is received.

## ATTACHMENT C-2: REFERENCE TABLES

**Table C5.1-1 MRTFB Missions and Combat Radius**

MRTFB "(1983 Title)"	Location	Coordinates	Mission	NM EAFB	NM PAX	Selection Criteria		
						4.1.1. a)	4.1.1. b)	4.1.1. c)
ARMY ACTIVITIES								
White Sands Missile Range, including Electronic Proving Ground at Ft Huachuca, AZ	NM & AZ	3250N: 10559W	Missile and Rocket Testing	606	1476	Pass	Pass	Pass
High Energy Laser Systems Test Facility	NM	3250N: 10559W	Directed Energy Testing	606	1476	Pass	Fail	
U.S. Army Kwajalein Atoll	Kwajalein Atoll	0843N: 16743E	ICBM Testing	4343	6261	Fail		
Yuma Proving Ground	AZ	3239N: 11436W	Artillery and Air Deliverable Weapons Testing	214	1886	Pass	Pass	Pass
Dugway Proving Ground	UT	4012N: 11256W	Chemical and Biological Testing	396	1692	Pass	Fail	
Aberdeen Test Center	MD	3928N: 07610W	Artillery and Armored Vehicle Testing	1998	71	Pass	Fail	
NAVY ACTIVITIES								
Naval Air Warfare Center-Weapons Division (Pacific Missile Test Center), Point Mugu	CA	3407N: 11907W	Sea Test Range	77	2068	Pass	Pass	Pass
Naval Air Warfare Center-Weapons Division (Naval Weapons Center), China Lake	CA	3541N: 11741W	Air & Surface Launched weapons, EW systems	48	1971	Pass	Pass	Pass
Naval Air Warfare Center-Aircraft Division (Naval Air Test Center), Patuxent River	MD	3817N: 07624W	Flight Test Center	1995	0	Pass	Pass	Pass
Atlantic Undersea Test and Evaluation Center	Bahamas	2409N: 07735W	Underwater Testing	2188	851	Fail		
Pacific Missile Range Facility	HI	2119N: 15755W	Naval Weapons Testing	2256	4240	Fail		



MRTFB "(1983 Title)"	Location	Coordinates	Mission	NM EAFB	NM PAX	Selection Criteria		
						4.1.1. a)	4.1.1. b)	4.1.1. c)
AIR FORCE ACTIVITIES								
45th Space Wing (Eastern Space and Missile Center), Cape Canaveral	FL	2814N: 08036W	Space and Missile Testing	1939	639	Pass	Fail	
30th Space Wing (Western Space and Missile Center), Vandenberg	CA	3444N: 12035W	Space and Missile Testing	133	2125	Pass	Fail	
Arnold Engineering Development Center (Aeronautical Systems Division)	TN	3523N: 08605W	Ground Test Facilities	1556	497	Pass	Fail	
Nevada Test and Training Range [NTTR] (Tactical Fighter Weapons Center)	NV	3614N: 11502W	Combat & Weapons Testing	204	1838	Pass	Pass	Pass
Air Force Flight Test Center	CA	3454N: 11753W	Flight Test Center	0	1995	Pass	Pass	Pass
Utah Test and Training Range	UT	4107N: 11158W	Air-to-Air, Air-to-Ground, and EW testing	466	1642	Pass	Pass	Pass
Air Armament Center [AAC] 46th Test Wing (Armament Division - 3246th Test Wing)	FL	3029N: 08631W	Aircraft Weapons and Electronic Combat (EC) Tests	1602	685	Pass	Pass	Fail
DEFENSE INFORMATION SYSTEMS AGENCY ACTIVITY								
Joint Interoperability Test Command	NM	3135N: 11020W	Aerospace Navigation and Guidance Systems Tests	428	2065	Pass	Fail	
Not an MRTFB								
National Training Center, Ft Irwin, CA	CA	3516N: 11637W	Maneuver and Training Range inc Restricted AS	66	1929	Pass	Pass	Pass
Note: Selected locations are shaded.								
MRTFB = Major Range and Test Facility Base NM EAFB = nautical miles from Edwards Air Force Base NM PAX = nautical miles from Naval Air Test Center Patuxent River								

**Table C5.1-2 F-35 Missions and MRTFB Capabilities**

Critical Operational Issues (COI-Missions)	Objective	Weapons			Locations							
		AAM	Bombs	Guns	WSMR	Yuma	Pt Mugu	China Lake	NTTR	AFFTC	UTTR	NTC
COI 1: Air-to-Surface Attack												
a) Strategic Attack	Hardened structures, industrial complex, vertical target		Y					Pass	Pass			
b) Air Interdiction	Soft structures, mobile vehicles, air defenses, time critical targets		Y					Pass	Pass		Pass	
c) Offensive Counter Air (OCA) Airfield Attack	A/C on ground, A/C shelters/ hangars, reveted A/C, runways, POL tanks		Y					Pass	Pass		Pass	
d) Air-Surface Warfare (ASuW) Surface Warfare	Maritime						Pass					
e) Strike Coordination and Reconnaissance (SCAR)	Armored vehicles, technical vehicles		Y	Y				Pass	Pass		Pass	
COI 2: Close Air Support (CAS)												
a) CAS Battlefield	Armored vehicles, air defenses, dismounted troops		Y			Pass		Pass	Pass		Pass	Pass
b) CAS Urban	Soft structures, mobile vehicles, and air defenses		Y			Pass		Pass	Pass			Pass
c) Forward Air Controller Airborne [FAC(A)]	Various targets					Pass		Pass	Pass		Pass	Pass
COI 3: Air Warfare												
a) OCA (4v4 Sweep)	Air targets	Y					Pass	Pass	Pass		Pass	
b) OCA (4v8 Sweep)	Air targets	Y					Pass	Pass	Pass		Pass	
c) Defensive Counter Air (DCA)	Air targets	Y					Pass	Pass	Pass		Pass	
d) Escort	Air targets	Y					Pass	Pass	Pass		Pass	
e) Cruise Missile Defense (CMD)	Cruise missile	Y					Pass	Pass	Pass		Pass	

Critical Operational Issues (COI-Missions)	Objective	Weapons			Locations							
		AAM	Bombs	Guns	WSMR	Yuma	Pt Mugu	China Lake	NTTR	AFFTC	UTTR	NTC
COI 4: Electronic Attack												
a) Destruction of Enemy Air Defenses (DEAD)	Advanced hardened air defenses, stationary, mobile, and naval		Y					Pass	Pass			
b) Suppression of Enemy Air Defenses (SEAD)	Advanced air defenses stationary, mobile and naval		Y					Pass	Pass			
c) Electronic Warfare and Countermeasures	Individual threats							Pass	Pass			
COI 5: Combat Search and Rescue												
a) Combat Search and Rescue (CSAR)	As assigned	Y	Y					Pass	Pass		Pass	Pass
b) Tactical Recovery of Aircraft and Personnel (TRAP)	As assigned	Y	Y	Y				Pass	Pass		Pass	Pass
c) Assault Support Escort (ASE)	Ground Targets and Helicopters	Y	Y	Y				Pass	Pass		Pass	Pass
COI 6: Reconnaissance												
a) Aerial Reconnaissance	As assigned	Y						Pass	Pass		Pass	
b) Armed Reconnaissance	As assigned		Y					Pass	Pass		Pass	
Live Fire					Pass		Pass	Pass	Pass		Pass	
Flight Training and Proficiency										Pass		
Required Test Ranges							Pass	Pass	Pass			
Y: Yes Pass: Test Range has the resources and capabilities to meet the COI's objectives including live fire when applicable AAM = Air to Air Missile AFFTC = Air Force Flight Test Center (Edwards Air Force Base) NTC = National Training Center (Fort Irwin) NTTR = Nevada Test and Training Range UTTR = Utah Test and Training Range WSMR = White Sands Missile Range Note: Preferred Test Ranges may change as the test results are analyzed or as other considerations become apparent.												

**Table C5.3-1 Deployment Demonstration Site Narrowing**

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
Ellsworth AFB	South Dakota	13497	880	Pass	Pass	Pass	Pass	Pass	NA	Pass	
Minot AFB	North Dakota	13197	1095	Pass	Pass	Pass	Pass	Pass	NA	Pass	
Grand Forks AFB	North Dakota	12350	1205	Pass	Pass	Pass	Pass	Pass	NA	Pass	
Wheeler Sack AAF	New York	10000	2008	Pass	Pass	Pass	Pass	Pass	NA	Pass	
Alpena Co Rgnl CRTC	Michigan	9001	CRTC 1680	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Volk Fld CRTC	Wisconsin	9000	CRTC 385	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Gulfport Biloxi Intl CRTC	Mississippi	9002	CRTC 1478	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Savannah Hilton Head Intl CRTC	Georgia	9351	CRTC 1836	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Choctaw NOLF	Florida	8000	22	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Duke Fld	Florida	8000	10	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Vandenberg AFB	California	15000	108	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Fallon NAS	Nevada	14005	307	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Kirtland AFB	New Mexico	13793	576	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Davis Monthan AFB	Arizona	13643	396	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Hill AFB	Utah	13508	513	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Lemoore NAS	California	13502	142	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Mountain Home AFB	Idaho	13500	539	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
March ARB	California	13300	63	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Yuma MCAS Yuma Intl	Arizona	13299	214	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Palmdale Rgnl USAF Plt 42	California	12002	30	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Miramar MCAS	California	12000	107	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Castle AFB	California	11802	200	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Point Mugu NAS	California	11102	45	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Michael AAF	Utah	11000	520	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Nellis AFB	Nevada	10123	204	Pass	Pass	Pass	Pass	Pass	Pass	Fail	

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
San Nicolas Island NOLF	California	10002	100	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
China Lake NAWS	California	9991	20	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Luke AFB	Arizona	9904	303	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
El Centro NAF	California	9503	150	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
San Clemente Island NALF	California	9300	100	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Creech AFB	Nevada	9002	148	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Twentynine Palms MCAGCC	California	8015	93	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Los Alamitos AAF	California	8000	300	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
North Island NAS	California	8000	113	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Edwards AFB	California	12000	0	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Beale AFB	California	12000	306	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Travis AFB	California	10992	280	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Amedee AAF	California	10200	340	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Gila Bend AF Aux	Arizona	8500	285	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Holloman AFB	New Mexico	12131	600	Pass	Pass	Pass	Pass	Pass	Pass	Fail	
Fairchild AFB	Washington	13899	763	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Biggs AAF	Texas	13551	606	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Dyess AFB	Texas	13500	913	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Altus AFB	Oklahoma	13440	918	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Sheppard AFB Wichita Fall	Texas	13101	962	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Wright Patterson AFB	Ohio	12601	1634	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Whiteman AFB	Missouri	12400	1190	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Beaufort MCAS	South Carolina	12188	1854	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Eglin AFB	Florida	12005	1602	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Columbus AFB	Mississippi	12004	1460	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Fort Worth NAS JRB	Texas	12002	1027	Pass	Pass	Pass	Pass	Pass	Fail	Fail	

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
Robins AFB	Georgia	12001	1711	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Little Rock AFB	Arkansas	12000	1266	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Mc Connell AFB	Kansas	12000	1010	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Oceana NAS	Virginia	12000	2026	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Patuxent River NAS	Maryland	11809	1996	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Campbell AAF	Kentucky	11800	1480	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Seymour Johnson AFB	North Carolina	11758	1950	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Barksdale AFB	Louisiana	11756	1217	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Lackland AFB Kelly Fld AN	Texas	11550	1036	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Macdill AFB	Florida	11421	1854	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Hunter AAF	Georgia	11375	1841	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Homestead ARB	Florida	11201	2016	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Tinker AFB	Oklahoma	11100	1006	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Buckley AFB	Colorado	11000	690	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Mc Chord AFB	Washington	10108	764	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Shaw AFB	South Carolina	10024	1845	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Mc Guire AFB	New Jersey	10001	2068	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Cannon AFB	New Mexico	10000	720	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Cape Canaveral AFS Skid S	Florida	10000	1936	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Key West NAS	Florida	10000	1976	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Langley AFB	Virginia	10000	2008	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Lawson AAF	Georgia	10000	1647	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Robert Gray AAF	Texas	10000	1036	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Scott AFB Midamerica	Illinois	10000	1364	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Tyndall AFB	Florida	10000	1657	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
New Orleans NAS JRB	Louisiana	9999	1442	Pass	Pass	Pass	Pass	Pass	Fail	Fail	

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
Dover AFB	Delaware	9601	2033	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Offutt AFB	Nebraska	9601	1102	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Eppley Afd	Nebraska	9502	1106	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Andrews AFB	Maryland	9300	1970	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Moody AFB	Georgia	9300	1758	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Vance AFB	Oklahoma	9201	978	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Patrick AFB	Florida	9023	1939	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Charleston AFB Intl	South Carolina	9001	1881	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Cherry Point MCAS	North Carolina	8984	2007	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Laughlin AFB	Texas	8857	931	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Randolph AFB	Texas	8351	1047	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Maxwell AFB	Alabama	8013	1579	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Corpus Christi NAS	Texas	8003	1141	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Meridian NAS	Mississippi	8002	1468	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Pensacola NAS	Florida	8002	2165	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Willow Grove NAS JRB	Pennsylvania	8002	2042	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Brunswick NAS	Maine	8000	2259	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Fentress NALF	Virginia	8000	2022	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Jacksonville NAS	Florida	8000	1846	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Kingsville NAS	Texas	8000	1122	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
MacDill AFB Aux Fld	Florida	8000	1916	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Orange Grove NALF	Texas	8000	1099	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
Whidbey Island NAS	Washington	8000	836	Pass	Pass	Pass	Pass	Pass	Fail	Fail	
White Sands NASA (LZ)	New Mexico	15017		Pass	Pass	Pass	Pass	Fail			
Bicycle Lake AAF	California	9500		Pass	Pass	Pass	Pass	Fail			
Malmstrom AFHP	Montana	11500		Pass	Pass	Pass	Fail				

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
El Toro MCAS	California	10000		Pass	Pass	Pass	Fail				
Bangor Intl	Maine	11440		Pass	Pass	Fail					
Minneapolis St Paul Intl	Minnesota	11006		Pass	Pass	Fail					
Great Falls Intl	Montana	10502		Pass	Pass	Fail					
Klamath Falls	Oregon	10301		Pass	Pass	Fail					
Duluth Intl	Minnesota	10152		Pass	Pass	Fail					
Boise Air Terminal	Idaho	10000		Pass	Pass	Fail					
Sioux Gateway Col Bud Day	Iowa	9002		Pass	Pass	Fail					
Hector Intl	North Dakota	9000		Pass	Pass	Fail					
Joe Foss Fld	South Dakota	8999		Pass	Pass	Fail					
Lincoln	Nebraska	12901		Pass	Pass	Fail					
Forbes Fld	Kansas	12802		Pass	Pass	Fail					
Grissom ARB	Indiana	12501		Pass	Pass	Fail					
Rickenbacker Intl	Ohio	12102		Pass	Pass	Fail					
Salt Lake City Intl	Utah	12004		Pass	Pass	Fail					
Birmingham Intl	Alabama	12002		Pass	Pass	Fail					
Fort Wayne Intl	Indiana	11981		Pass	Pass	Fail					
Louisville Intl Standifor	Kentucky	11870		Pass	Pass	Fail					
Griffiss Afld	New York	11820		Pass	Pass	Fail					
Stewart Intl	New York	11818		Pass	Pass	Fail					
Westover ARB Metropolitan	Massachusetts	11597		Pass	Pass	Fail					
Pittsburgh Intl	Pennsylvania	11500		Pass	Pass	Fail					
Portsmouth Intl At Pease	New Hampshire	11321		Pass	Pass	Fail					
Memphis Intl	Tennessee	11120		Pass	Pass	Fail					
Nashville Intl	Tennessee	11030		Pass	Pass	Fail					
Lambert St Louis Intl	Missouri	11019		Pass	Pass	Fail					



				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
Reno Tahoe Intl	Nevada	11002		Pass	Pass	Fail					
Portland Intl	Oregon	11000		Pass	Pass	Fail					
Tucson Intl	Arizona	10996		Pass	Pass	Fail					
Toledo Express	Ohio	10600		Pass	Pass	Fail					
Phoenix Sky Harbor Intl	Arizona	10300		Pass	Pass	Fail					
Greater Peoria Rgnl	Illinois	10104		Pass	Pass	Fail					
Key Fld	Mississippi	10003		Pass	Pass	Fail					
W K Kellogg	Michigan	10003		Pass	Pass	Fail					
Harrisburg Intl	Pennsylvania	10001		Pass	Pass	Fail					
Atlantic City Intl	New Jersey	10000		Pass	Pass	Fail					
Charlotte Douglas Intl	North Carolina	10000		Pass	Pass	Fail					
Dobbins ARB	Georgia	10000		Pass	Pass	Fail					
Tulsa Intl	Oklahoma	9999		Pass	Pass	Fail					
Niagara Falls Intl	New York	9829		Pass	Pass	Fail					
Will Rogers World	Oklahoma	9802		Pass	Pass	Fail					
General Mitchell Intl	Wisconsin	9690		Pass	Pass	Fail					
Bradley Intl	Connecticut	9510		Pass	Pass	Fail					
Cheyenne Rgnl Jerry Olson	Wyoming	9270		Pass	Pass	Fail					
Fresno Yosemite Intl	California	9227		Pass	Pass	Fail					
Moffett Federal Afd	California	9202		Pass	Pass	Fail					
Terre Haute Intl Hulman F	Indiana	9020		Pass	Pass	Fail					
McEntire JNGB	South Carolina	9017		Pass	Pass	Fail					
Montgomery Rgnl	Alabama	9010		Pass	Pass	Fail					
Springfield Beckley Muni	Ohio	9009		Pass	Pass	Fail					
Dane Co Rgnl Truax Fld	Wisconsin	9006		Pass	Pass	Fail					
McGhee Tyson	Tennessee	9005		Pass	Pass	Fail					

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
Syracuse Hancock Intl	New York	9003		Pass	Pass	Fail					
Youngstown Warren Rgnl	Ohio	9003		Pass	Pass	Fail					
Des Moines Intl	Iowa	9001		Pass	Pass	Fail					
Ellington Fld	Texas	9001		Pass	Pass	Fail					
Mansfield Lahm Rgnl	Ohio	9001		Pass	Pass	Fail					
Barnes Muni	Massachusetts	9000		Pass	Pass	Fail					
Francis S Gabreski	New York	9000		Pass	Pass	Fail					
North AF Aux	South Carolina	9000		Pass	Pass	Fail					
Selfridge ANGB	Michigan	9000		Pass	Pass	Fail					
Columbia Metropolitan	South Carolina	8601		Pass	Pass	Fail					
Burlington Intl	Vermont	8320		Pass	Pass	Fail					
Rosecrans Mem	Missouri	8059		Pass	Pass	Fail					
Fort Smith Rgnl	Arkansas	8000		Pass	Pass	Fail					
Otis ANGB	Massachusetts	8000		Pass	Pass	Fail					
Phillips AAF	Maryland	7997		Pass	Fail						
Joe Williams NOLF	Mississippi	7976		Pass	Fail						
Keesler AFB	Mississippi	7630		Pass	Fail						
Pope AFB	North Carolina	7501		Pass	Fail						
Redstone AAF	Alabama	7300		Pass	Fail						
South Weymouth NAS	Massachusetts	7002		Pass	Fail						
Seneca AAF	New York	6988		Pass	Fail						
Condron AAF	New Mexico	6125		Pass	Fail						
Gray AAF	Washington	6125		Pass	Fail						
Laguna AAF	Arizona	6118		Pass	Fail						
Ray S Miller AAF	Minnesota	6100		Pass	Fail						
Camp Pendleton MCAS	California	6006		Pass	Fail						

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
Arnold AFB	Tennessee	6000		Pass	Fail						
Whiting Fld NAS South	Florida	6000		Pass	Fail						
Sherman AAF	Kansas	5905		Pass	Fail						
Davison AAF	Virginia	5618		Pass	Fail						
Godman AAF	Kentucky	5585		Pass	Fail						
New River MCAS	North Carolina	5114		Pass	Fail						
Simmons AAF	North Carolina	5011		Pass	Fail						
Mackall AAF	North Carolina	5001		Pass	Fail						
Cairns AAF	Alabama	5000		Pass	Fail						
Delaware Muni	Ohio	5000		Pass	Fail						
Grayling AAF	Michigan	5000		Pass	Fail						
Henry Post AAF	Oklahoma	5000		Pass	Fail						
Wright AAF	Georgia	5000		Pass	Fail						
Zanesville Muni	Ohio	5000		Pass	Fail						
Butts AAF	Colorado	4573		Pass	Fail						
USAF Academy Afd	Colorado	4500		Pass	Fail						
Quantico MCAF	Virginia	4250		Pass	Fail						
Polk AAF	Louisiana	4109		Pass	Fail						
Stallion AAF	New Mexico	4000		Pass	Fail						
Muir AAF	Pennsylvania	3967		Pass	Fail						
Felker AAF	Virginia	3020		Pass	Fail						
Eastern WV Rgnl Shepherd	West Virginia	7800		Pass	Fail						
Quonset State	Rhode Island	7504		Pass	Fail						
New Castle	Delaware	7012		Pass	Fail						
Schenectady Co	New York	7000		Pass	Fail						
Martin State	Maryland	6996		Pass	Fail						

				Selection Criteria <sup>2</sup>							
Airfield Name	State	Runway Length	NM to PMTF <sup>1</sup>	4.3.1 a) 4.4.1 a)	4.3.1 b) 4.4.1 b)	4.3.1 c) 4.4.1 c)	4.3.1 d) 4.4.1 d)	4.3.1 e) 4.4.1 e)	4.3.2 a)	4.4.1 f)	4.4.2 a)
Yeager	West Virginia	6302		Pass	Fail						
Notes: (1) Nautical Miles To Mtf Are Not Provided For Locations That Did Not Pass Criteria 4.3.1 A), B), C), D), And E) And Criteria 4.4.1 A), B), C), D), And E). (2) Selection Criteria Are Taken From Sections Within Text. Nm To Pmtf = Nautical Miles To Preferred Main Test Facility											

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## **APPENDIX D**

### **IOT&E ACTIVITY DETAIL**



Location	Table D-1A. F-35 Training and Proficiency Flights																	
	Block 2								Block 3								Total	
	F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total		F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total			
	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs
Basing																		
Edwards AFB	315	0	317	0	0	0	632	0	510	0	520	0	515	0	1,545	0	2,177	0
Test Ranges																		
R-2508 Complex	105	190	105	190	0	0	210	380	170	303	170	303	170	303	510	910	720	1,290
NAWCWD China Lake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NAWCWD Point Mugu Ranges	105	100	105	100	0	0	210	200	170	160	170	160	170	160	510	480	720	680
NTTR	105	140	105	140	0	0	210	280	170	147	170	147	170	147	510	440	720	720
UTTR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NTC Fort Irwin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCAS Yuma Ranges	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total	315	430	315	430	0	0	630	860	510	610	510	610	510	610	1,530	1,830	2,160	2,690
Deployment Demo Locations																		
Alpena CRTC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwards AFB SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eglin AFB / Duke Field	0	0	24	19	0	0	24	19	0	0	0	0	0	0	0	0	24	19
MCAGC 29 Palms	0	0	0	0	0	0	0	0	0	0	63	90	0	0	63	90	63	90
MCAS Yuma	0	0	0	0	0	0	0	0	0	0	40	32	0	0	40	32	40	32
NAS Lemoore	0	0	0	0	0	0	0	0	0	0	0	0	120	96	120	96	120	96
Volk Field ANGB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L- Class Deployed Ship	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CVN Deployed Ship	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total	0	0	24	19	0	0	24	19	0	0	103	122	120	96	223	218	247	237
TOTAL	315	430	339	449	0	0	654	879	510	610	613	732	630	706	1,753	2,048	2,407	2,927

NOTE: Some sortie numbers and flight hours may change, it is common for test parameters to change as the testing test results are analyzed and as the test program evolves, however, the total sorties and flight hours should be reasonably stable.



Location	Table D-1B. F-35 Flight Tests																	
	Block 2								Block 3								Total	
	F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total		F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total			
	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs
Basing																		
Edwards AFB	626	0	598	0	0	0	1,224	0	838	0	837	0	835	0	2,510	0	3,734	0
Test Ranges																		
R-2508 Complex	165	240	165	240	0	0	330	480	177	260	177	260	177	260	530	780	860	1,260
NAWCWD China Lake	105	155	105	155	0	0	210	310	180	267	180	267	180	267	540	800	750	1,110
NAWCWD Point Mugu Ranges	5	5	5	5	0	0	10	10	20	20	20	20	20	20	60	60	70	70
NTTR	30	65	30	65	0	0	60	130	63	123	63	123	63	123	190	370	250	500
UTTR	105	210	105	210	0	0	210	420	187	367	187	367	187	367	560	1,100	770	1,520
WSMR	5	10	5	10	0	0	10	20	3	7	3	7	3	7	10	20	20	40
NTC Fort Irwin	20	30	20	30	0	0	40	60	23	33	23	33	23	33	70	100	110	160
MCAS Yuma Ranges	165	240	165	240	0	0	330	480	177	260	177	260	177	260	530	780	860	1,260
Sub-Total	600	955	600	955	0	0	1,200	1,910	830	1,337	830	1,337	830	1,337	2,490	4,010	3,690	5,920
Deployment Demo Locations																		
Alpena CRTC	0	0	0	0	0	0	0	0	6	17	6	17	0	0	12	34	12	34
Edwards AFB SB	24	59	0	0	0	0	24	59	0	0	0	0	0	0	0	0	24	59
Eglin AFB / Duke Field	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCAGC 29 Palms	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCAS Yuma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NAS Lemoore	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volk Field ANGB	34	110	0	0	0	0	34	110	92	268	0	0	0	0	92	268	126	378
L- Class Deployed Ship	0	0	0	0	0	0	0	0	0	0	103	170	0	0	103	170	103	170
CVN Deployed Ship	0	0	0	0	0	0	0	0	0	0	0	0	84	179	84	179	84	179
Sub-Total	58	169	0	0	0	0	58	169	98	285	109	187	84	179	291	651	349	820
TOTAL	658	1,124	600	955	0	0	1,258	2,079	928	1,622	939	1,524	914	1,516	2,781	4,661	4,039	6,740

NOTE: Some sortie numbers and flight hours may change, it is common for test parameters to change as the testing test results are analyzed and as the test program evolves, however, the total sorties and flight hours should be reasonably stable.

Location	Table D-1C. F-35 Total Sorties / Flight Hours																	
	Block 2								Block 3								TOTAL	
	F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total		F-35A (CTOL)		F-35B (STOVL inc UK)		F-35C (CV)		Sub-Total			
	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs	Sorties	Flt Hrs
Basing																		
Edwards AFB	941	0	915	0	0	0	1,856	0	1,348	0	1,357	0	1,350	0	4,055	0	5,911	0
Test Ranges																		
R-2508 Complex	270	430	270	430	0	0	540	860	347	563	347	563	347	563	1,040	1,690	1,580	2,550
NAWCWD China Lake	105	155	105	155	0	0	210	310	180	267	180	267	180	267	540	800	750	1,110
NAWCWD Point Mugu Ranges	110	105	110	105	0	0	220	210	190	180	190	180	190	180	570	540	790	750
NTTR	135	205	135	205	0	0	270	410	233	270	233	270	233	270	700	810	970	1,220
UTTR	105	210	105	210	0	0	210	420	187	367	187	367	187	367	560	1,100	770	1,520
WSMR	5	10	5	10	0	0	10	20	3	7	3	7	3	7	10	20	20	40
NTC Fort Irwin	20	30	20	30	0	0	40	60	23	33	23	33	23	33	70	100	110	160
MCAS Yuma Ranges	165	240	165	240	0	0	330	480	177	260	177	260	177	260	530	780	860	1,260
Sub-Total	915	1,385	915	1,385	0	0	1,830	2,770	1,340	1,947	1,340	1,947	1,340	1,947	4,020	5,840	5,850	8,610
Deployment Demo Locations																		
Alpena CRTC	0	0	0	0	0	0	0	0	6	17	6	17	0	0	12	34	12	34
Edwards AFB SB	24	59	0	0	0	0	24	59	0	0	0	0	0	0	0	0	24	59
Eglin AFB / Duke Field	0	0	24	19	0	0	24	19	0	0	0	0	0	0	0	0	24	19
MCAGC 29 Palms	0	0	0	0	0	0	0	0	0	0	63	90	0	0	63	90	63	90
MCAS Yuma	0	0	0	0	0	0	0	0	0	0	40	32	0	0	40	32	40	32
NAS Lemoore	0	0	0	0	0	0	0	0	0	0	0	0	120	96	120	96	120	96
Volk Field ANGB	34	110	0	0	0	0	34	110	92	268	0	0	0	0	92	268	126	378
L- Class Deployed Ship	0	0	0	0	0	0	0	0	0	0	103	170	0	0	103	170	103	170
CVN Deployed Ship	0	0	0	0	0	0	0	0	0	0	0	0	84	179	84	179	84	179
Sub-Total	58	169	24	19	0	0	82	188	98	285	212	309	204	275	514	869	596	1,057
TOTAL	973	1,554	939	1,404	0	0	1,912	2,958	1,438	2,232	1,552	2,256	1,544	2,222	4,534	6,709	6,446	9,667

NOTE: Some sortie numbers and flight hours may change, it is common for test parameters to change as the testing test results are analyzed and as the test program evolves, however, the total sorties and flight hours should be reasonably stable.

Table D-2. IOT&amp;E Weapon Expenditures

Weapon	F-35 Variant	Block 2	Block 3	Totals
<b>Air to Air Weapons</b>				
AIM-9X Sidewinder	CTOL		3	3
	CV		4	4
	STOVL		2	2
AIM-120C-5 AMRAAM	UK STOVL	1	0	1
AIM-120C-7 AMRAAM	CTOL		7	7
	CV		4	4
	STOVL	4	2	6
AIM-132 ASRAAM (UK)	UK STOVL		4	4
25MM Rounds TP (Internal Gun)	CTOL		724	724
(Gun Pod)	CV		896	896
(Gun Pod)	STOVL		896	896
MJU-64B Flare / CCU-145/A Squib		1600 / 1600	6600 / 6600	8200 / 8200
MJU-68/B Flare / CCU-145/A Squib		400 / 400	1550 / 1550	1950 / 1950
MJU-69/B Flare / CCU-168/B Squib		400 / 400	1550 / 1550	1950 / 1950
RFCM / CCU-136A/A Squib (two squibs per RFCM)		25 / 50	50 / 100	75 / 150
<b>Air to Ground Weapons</b>				
JDAM Mk-84 2,000 lb	CTOL		1	1
	CV		2	2
	CTOL		1	1
JDAM BLU-109 2000 lb	CV		1	1
	CV		2	2
	STOVL	1	3	4
JDAM Mk-83 1,000 lb	STOVL	1	0	1
	CV		4	4
	UK STOVL	0	16	16
PGB 500 lb (UK)	UK STOVL	0	16	16
GBU-39 Small Diameter Bomb	CTOL		16	16
GBU-12 Laser Guided Bomb	CTOL	4	2	6
	CV		4	4
	STOVL	4	2	6
	CTOL	2,896	6,878	9,774
25MM Rounds TP (Internal Gun)	CV		5,376	5,376
(Gun Pod)	STOVL		8,512	8,512
(Gun Pod)	STOVL		8,512	8,512

## Notes:

1. Shaded blocks indicate weapon not cleared for a specific variant in corresponding Block phase of test.
2. IOT&E A/G weapon expenditures based on calculating CEP for ORD A/G weapon threshold categories of GPS aided munitions, precision (laser) guidance support, and gun. UK PGB 500 lb weapon expenditures based on separate CEP calculation.
3. 25MM gun rounds based on live gun firing events and CAS/FAC(A) sorties.

## **APPENDIX E**

### **REGULATORY CONSULTATION AND DRAFT ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT COMMENTS**



## Appendix E

### Table of Contents

	<u>Page</u>
National Marine Fisheries Service Southwest Regional Office Letter .....	1
USFWS, Carlsbad Field Office, California, Letter .....	9
USFWS, East Lansing Ecological Services Office, Michigan, Letter .....	17
USFWS, East Lansing Ecological Services Office, Michigan, Response .....	22
USFWS, Green Bay Ecological Services Office, Wisconsin, Letter .....	25
USFWS, Green Bay Ecological Services Office, Wisconsin, Response .....	30
USFWS, Nevada Office Letter .....	31
USFWS, New Mexico Ecological Services Field Office Letter .....	39
USFWS, Panama City Field Office Letter .....	47
USFWS, Sacramento Field Office, San Joaquin Valley Branch, California, Letter .....	53
USFWS, Southern Nevada Field Office Letter .....	59
USFWS, Tucson Sub Office, Arizona, Letter .....	67
USFWS, Utah Ecological Services Field Office Letter .....	75
USFWS, Utah Ecological Services Field Office Response .....	84
USFWS, Ventura Field Office, California, Letter .....	87
USFWS, Ventura Field Office, California, Response .....	99
State Historic Preservation Officer, Arizona State Parks Letter .....	105
State Historic Preservation Officer, Arizona State Parks Response .....	112
Office of Historic Preservation, California Department of Parks and Recreation Letter .....	115
Office of Historic Preservation, California Department of Parks and Recreation Response .....	125
Florida Historic Preservation Office Letter .....	127
Florida Historic Preservation Office Response .....	132
State Historic Preservation Officer, Michigan Historical Center Letter .....	133
Nevada State Historic Preservation Office Response .....	139
New Mexico Department of Cultural Affairs, Historic Preservation Division Letter .....	141
New Mexico Department of Cultural Affairs, Historic Preservation Division Response .....	147
State Historic Preservation Officer, Utah State Historical Society Letter .....	149
State Historic Preservation Officer, Utah State Historical Society Response .....	152
Wisconsin Historical Society Letter .....	153
Wisconsin Historical Society Response .....	158
Notice of Availability .....	159
New Mexico Environment Department Comments .....	161
California State Clearinghouse Comments .....	163
USFWS Nevada Comments .....	165
Bill Gries, Edwards AFB Airspace Manager Comments .....	169
SMSgt David L. Nichols, Acting Environmental Management Officer, Alpena CRTC Comments .....	173
Daniel D. Gonnering, Natural Resource Manager, Volk Field CRTC Comments .....	174
Cocopah Indian Tribe Letter .....	175
Quechan Indian Tribe Letter .....	177
Quechan Indian Tribe Comments .....	179
Edwards AFB Indian Tribes Consultation Letter .....	181
Hill AFB Indian Tribes Consultation Letter .....	183
Consolidated Group of Tribes and Organizations Comments .....	187
Responses to Comments .....	203





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR NMFS Southwest Regional Office  
501 West Ocean Boulevard  
Long Beach, CA 90802

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
- (b) National Environmental Policy Act of 1969.

In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "CJB", followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1
- 3. Figure 2



**NMFS Southwest Regional Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

The Joint Strike Fighter (JSF) program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) phases. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities that would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on Figure 1.

- 1) Basing the F-35 aircraft:
  - Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)
  - Training and Proficiency Flights:
    - R-2508 Complex (Edwards AFB airspace)
    - Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges, California
    - Nevada Test and Training Range (NTTR), Nevada
  - Flight Testing:
    - R2508 Complex (Edwards AFB airspace)
    - Marine Corps Air Station (MCAS), Yuma Ranges, Arizona
    - National Training Center (NTC), Fort Irwin, California
    - NAWCWD, China Lake, California
    - NAWCWD, Point Mugu Ranges, California
    - NTTR, Nevada
    - Utah Test and Training Range (UTTR), Utah
    - White Sands Missile Range (WSMR), New Mexico
- 3) Deployment Demonstrations:
  - Alpena Combat Readiness Training Center (CRTC), Michigan
  - Edwards AFB
  - Eglin AFB, FL
  - Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California
  - MCAS Yuma, Arizona
  - NAS Lemoore, California
  - Carriers on the NAWCWD Point Mugu Ranges

## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB. No F-35 aircraft landings/takeoffs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of an emergency.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur, with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this NMFS Area**

The JSF IOT&E location within the NMSF Southwest Regional Office is the NAWCWD Point Mugu Ranges. Activities proposed for NAWCWD Point Mugu Ranges include pilot training and proficiency flights, test flights, and deployment demonstrations. These activities would occur within the Navy's Pacific Range Sea Range located off the coast of Point Mugu (Figure 2). Approximately 220 F-35 sorties would be flown approximately 220 hours during year 1 and approximately 570 F-35 sorties would be flown approximately 540 hours during year 2 in NAWCWD Point Mugu Ranges airspace. No ground activities would occur at NAWCWD Point Mugu; however, targets would be launched during air-to-air live missile shot weapon missions on the Sea Range. Approximately 22 aerial targets would be launched, and 21 air-to-air live missile shots would occur. All IOT&E test flight activities would occur during daylight and would occur at a minimum of 12 nautical miles offshore.

The NAWCWD Point Mugu Ranges are currently identified as one of the preferred locations for deployment demonstrations. Two shipboard deployment demonstrations would occur on the ranges.

### Federally Listed Species

The NAWCWD Point Mugu Ranges (Sea Range) are located off the coast of Los Angeles, Ventura, Santa Barbara, and San Luis Obispo counties. Federally listed species potentially occurring in the Sea Range area are listed in Table 1. A separate letter has also been sent to the USFWS Ventura Office.

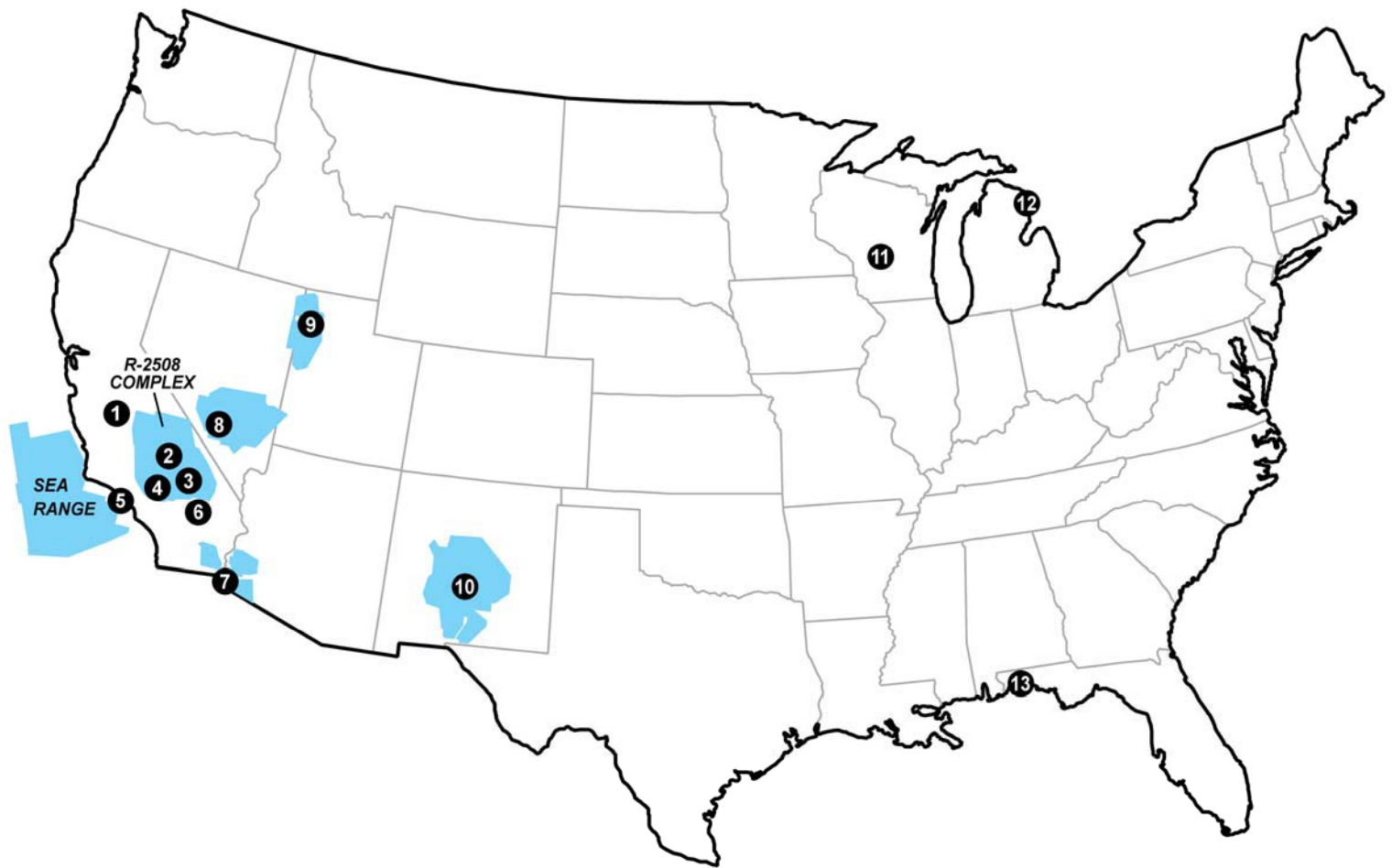
**Table 1. Federally Listed Animal Species for the Point Mugu Sea Range Area**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Federal Status</b>
<b><i>Fish</i></b>		
<i>Eucyclogobius newberryi</i>	Tidewater goby	Endangered
<i>Gasterosteus aculeatus williamsoni</i>	Unarmoured three-spined stickleback	Endangered
<i>Oncorhynchus kisutch</i>	Coho salmon	Endangered
<i>Oncorhynchus mykiss</i>	Steelhead trout	Threatened
<b><i>Herps</i></b>		
<i>Bufo microscaphus californicus</i>	Arroyo toad	Endangered
<i>Rana aurora draytonii</i>	California red-legged frog	Threatened
<b><i>Birds</i></b>		
<i>Bireo bellii pusillus</i>	Least Bell's vireo	Endangered
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	Threatened
<i>Empidonax trailli extimus</i>	Southwestern willow flycatcher	Endangered
<i>Falco peregrinus anatum</i>	American peregrine falcon	Delisted
<i>Haliaeetus leucocephalus</i>	Bald eagle	Delisted
<i>Pelecanus occidentalis californicus</i>	California brown pelican	Endangered
<i>Sterna antillarum browni</i>	California least tern	Endangered
<b><i>Mammals</i></b>		
<i>Arctocephalus townsendi</i>	Guadalupe fur-seal	Threatened
<i>Balaena glacialis</i>	Right whale	Endangered
<i>Balaenoptera borealis</i>	Sei whale	Endangered
<i>Balaenoptera physalus</i>	Finback whale	Endangered
<i>Balaenoptea musculus</i>	Blue whale	Endangered
<i>Enhydra lutris nereis</i>	Southern sea otter	Threatened
<i>Eumetopias jubatus</i>	Steller (=northern) sea-lion	Threatened
<i>Megaptera novaengliae</i>	Humpback whale	Endangered
<i>Physeter macrocephalus</i>	Sperm whale	Endangered

## **Biological Resource Impacts**

JSF IOT&E activities proposed for the Point Mugu Ranges include F-35 overflights and two ship-based deployment demonstrations. Airborne noise in the Sea Range is created by subsonic and supersonic flight activity of aircraft, aerial targets, and missiles. Noise sources associated with the Proposed Action would be consistent with these existing noise sources. Existing activities on the Point Mugu Ranges were analyzed in the Environmental Impact Statement (EIS)/Overseas EIS Pt Mugu Sea Range. This document concluded that impacts to biological resources from range activity, including those from aircraft, missile, and target overflight, ship operations, and debris from weapons missions, would not be significant.

JSF IOT&E activities proposed for the Point Mugu Ranges also include a total of 22 aerial target launches and air-to-air live missile shots. Current air-to-air operations on the Sea Range involve high-altitude aircraft operations, launch of targets from NAWCWD Point Mugu, target debris falling into the ocean, occasional intact missiles or targets impacting the ocean, and possibly target recovery using a helicopter. These activities were analyzed in the EIS/OEIS Pt Mugu Sea Range. The EIS/OEIS findings are that impacts of these activities on biological resources in the Sea Range are less than significant. No significant impacts to wildlife from the Proposed Action would be expected.



## EXPLANATION

- 1 Naval Air Station, Lemoore, CA
- 2 Naval Air Warfare Center Weapons Division  
China Lake, CA
- 3 National Training Center, Fort Irwin, CA
- 4 Edwards Air Force Base, CA
- 5 Naval Air Warfare Center Weapons Division  
Point Mugu, CA
- 6 Marine Corps Air Ground Combat Center  
Twentynine Palms, CA
- 7 Marine Corps Air Station, Yuma, AZ

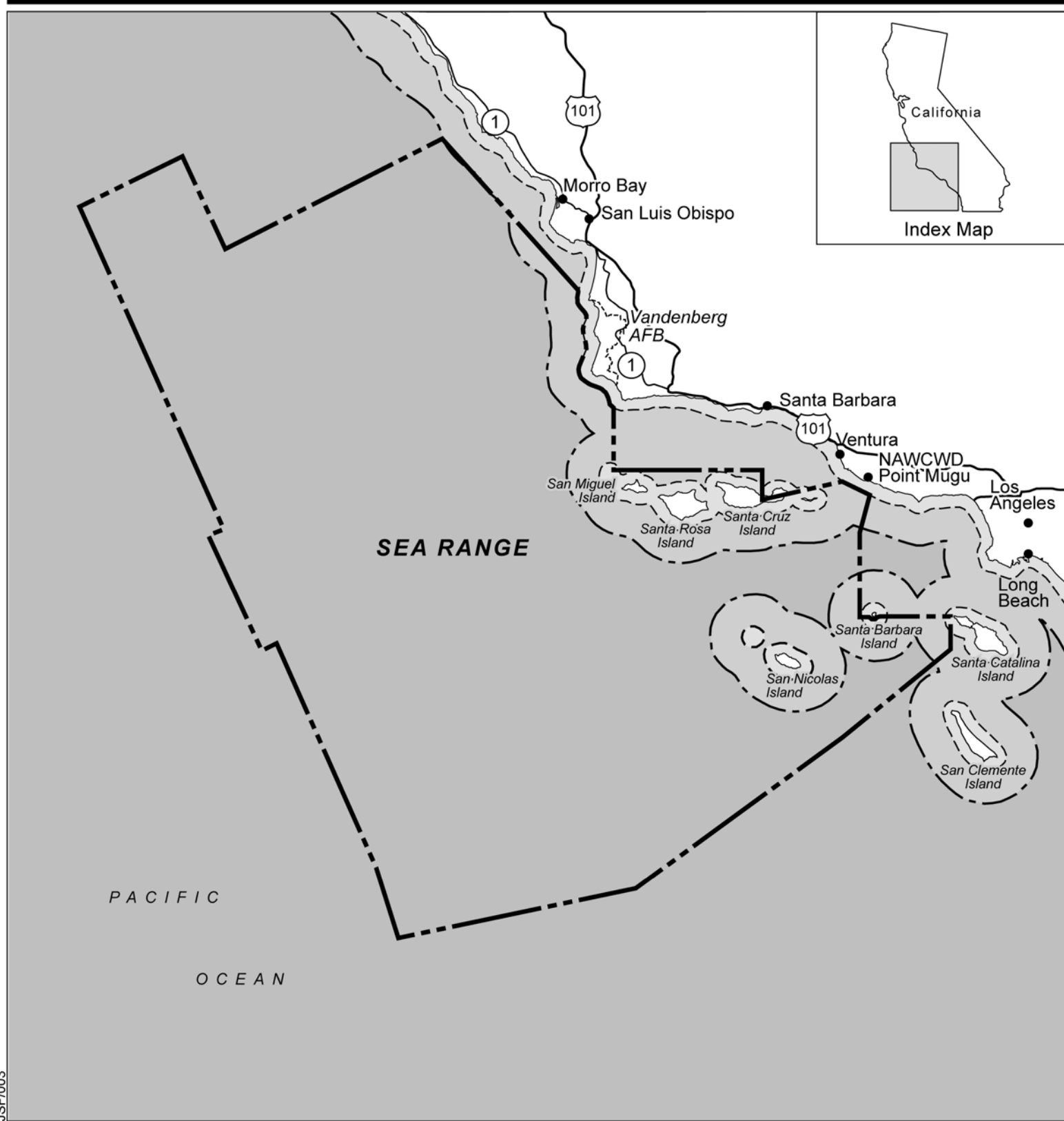
- 8 Nevada Test and Training Range, NV
- 9 Utah Test and Training Range, UT
- 10 White Sands Missile Range, NM
- 11 Volk Field Air National Guard Base, WI
- 12 Alpena Combat Readiness Training  
Center, MI
- 13 Eglin Air Force Base, FL

Test Range

## Joint Strike Fighter IOT&E Locations

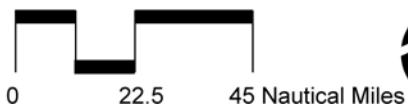


JSF/003



## EXPLANATION

-  Sea Range
-  U.S. Territorial Waters (12nm)
-  State Waters (3nm)
-  Military Installation
-  U.S. Highway
-  State Highway



## NAWCWD, Point Mugu and Sea Range, California

Figure 2



**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR            Carlsbad USFWS  
   Attn: Jim Bartel, Field Supervisor  
   6010 Hidden Valley Road, Suite 101  
   Carlsbad, CA 92011

FROM: HQ AFCEE/BC  
         3300 Sidney Brooks  
         Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

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CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1
- 3. Figure 2



**USFWS Carlsbad Field Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

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Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

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Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the Carlsbad Field Office Area is the Chocolate Mountains Range (Figure 2). The Chocolate Mountain Range is one of three ranges associated with MCAS Yuma. The other two are the western portion of the Barry Goldwater Range and the Kofa Range in Arizona. JSF IOT&E activities proposed for MCAS Yuma Ranges include test flights. A maximum of approximately 330 F-35 sorties would be flown a maximum of approximately 480 hours during year 1 and a maximum of approximately 530 F-35 sorties would be flown a maximum of approximately 780 hours during year 2. This is a maximum activity for all three MCAS Yuma Ranges combined; a breakdown of activity by the three ranges has not yet been developed. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for MCAS Yuma Range test flights.

## Federally Listed Species

The MCAS Yuma Ranges are located in La Paz and Yuma counties, Arizona, and Imperial County, California. Federally listed species for Imperial Counties are listed in Table 1. A separate letter has been submitted to the USFWS in Tucson, Arizona, for federally listed species in these Arizona counties.

**Table 1. Federally Listed Animal Species MCAS Yuma Ranges Area, California (Imperial County)**

<i>Scientific Name</i>	<i>Common Name</i>	<i>Status</i>
<b>Fish</b>		
<i>Cyprinodon macularis</i>	Desert pupfish	Endangered
<i>Gila elegans</i>	Bonytail chub	Endangered
<i>Ptychocheilus lucius</i>	Colorado squawfish	Endangered
<i>Xyrauchen texanus</i>	Razorback sucker	Endangered
<b>Reptiles</b>		
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Pelecanus occidentalis</i>	Brown pelican	Endangered
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered
<i>Sternula (Sterna) antillarum brownie</i>	California least tern	Endangered
<i>Vireo bellii pusillus</i>	Least Bell's vireo	Endangered
<b>Mammals</b>		
<i>Ovis canadensis</i>	Peninsular bighorn sheep	Endangered
<i>Panthera onca</i>	Jaguar	Endangered

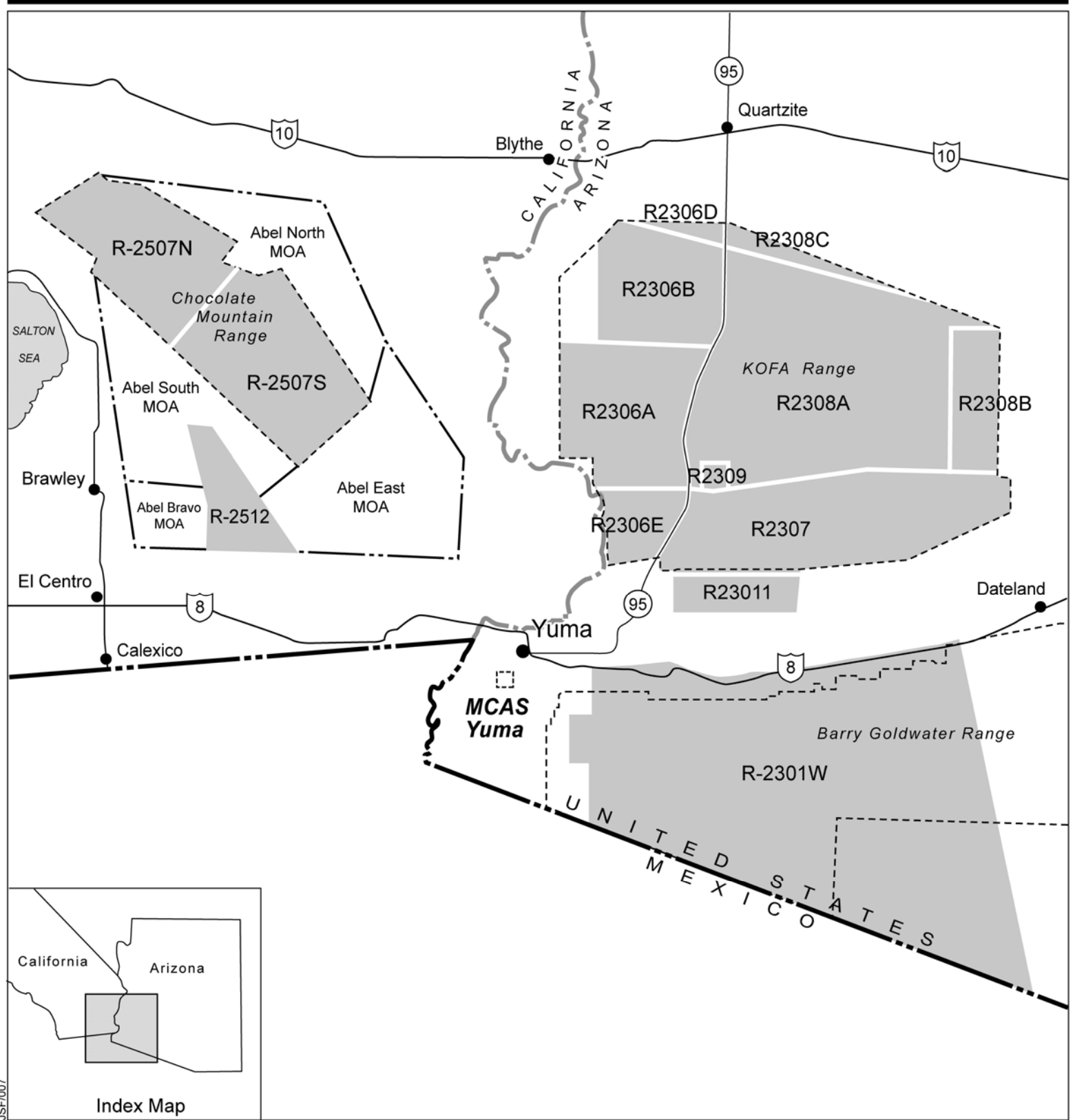
## Biological Resource Impacts

Potential impacts to biological resources in the test ranges could occur from F-35 aircraft overflights. Aircraft noise and visual exposure to aircraft present the potential to affect animals in the test range areas. No significant impacts to biological resources are expected.

Noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout test ranges at subsonic and supersonic levels and is recognized as a routine component of military activities. Although range flight activities may have the potential to impact wildlife, many species have shown an ability to acclimate to high noise levels, including sonic booms. This finding is supported by research conducted by the U.S. Air Force on the effects of jet noise from aircraft,

including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft-related noise exposure and do not exhibit significant adverse effects related to their hearing, behavior, or heart rate. Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout ranges where aircraft operations occur. Therefore, impacts from range flight operations are considered less than significant.

F-35 aircraft flying activities would adhere to all existing range restrictions including minimum heights AGL, aircraft overflight restricted areas, supersonic flight areas, and temporal restrictions. Therefore, JSF IOT&E activities would not present a new impact to wildlife, but would be consistent with the existing environment for these potential impacts to wildlife on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Therefore, overall range activity would not be expected to change significantly under the Proposed Action. Overflight noise from the F-35 is not expected to be louder than other military jets. No significant impacts to wildlife from the Proposed Action would be expected.

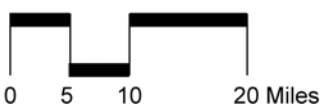


## EXPLANATION

- |  |                       |  |     |                          |
|--|-----------------------|--|-----|--------------------------|
|  | State Boundary        |  | MOA | Military Operations Area |
|  | U.S. Border           |  |     | MOA Boundary             |
|  | Restricted Airspace   |  |     |                          |
|  | Military Installation |  |     |                          |
|  | Interstate Highway    |  |     |                          |
|  | State Highway         |  |     |                          |

## Marine Corps Air Station, Yuma, and Ranges, Arizona and California

**Figure 2**







**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      Michigan USFWS  
East Lansing Ecological Services Office  
Attn: Craig Czarnecki, Field Supervisor  
2651 Coolidge Road  
East Lansing, MI 48823

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
- (b) National Environmental Policy Act of 1969.

In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "CJB", with a horizontal line extending to the right.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1



**USFWS East Lansing Ecological Services Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

The Joint Strike Fighter (JSF) program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) phases. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities that would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on Figure 1.

- 1) Basing the F-35 aircraft:
  - Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)
  - Training and Proficiency Flights:
    - R-2508 Complex (Edwards AFB airspace)
    - Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges, California
    - Nevada Test and Training Range (NTTR), Nevada
  - Flight Testing:
    - R2508 Complex (Edwards AFB airspace)
    - Marine Corps Air Station (MCAS), Yuma Ranges, Arizona
    - National Training Center (NTC), Fort Irwin, California
    - NAWCWD, China Lake, California
    - NAWCWD, Point Mugu Ranges, California
    - NTTR, Nevada
    - Utah Test and Training Range (UTTR), Utah
    - White Sands Missile Range (WSMR), New Mexico
- 3) Deployment Demonstrations:
  - Alpena Combat Readiness Training Center (CRTC), Michigan
  - Edwards AFB
  - Eglin AFB, FL
  - Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California
  - MCAS Yuma, Arizona
  - NAS Lemoore, California
  - Carriers on the NAWCWD Point Mugu Ranges

## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB. No F-35 aircraft landings/takeoffs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of an emergency.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur, with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

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Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the East Lansing Ecological Services Office Area is the CRTC Alpena. CRTC Alpena is currently identified as one of the preferred locations for deployment demonstration.

#### **Federally Listed Species**

Alpena CRTC is located in Alpena County, MI. Federally listed species for Alpena County are listed in Table 1.

#### **Biological Resource Impacts**

Based on the limited scope and duration of the proposed deployment demonstration activities, no significant impacts are expected and only a minimal discussion and analysis are provided for these locations in the EA/OEA.

**Table 1. Federally Listed Animal Species for Alpena County, MI**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<i>Charadrius melodus</i>	Piping plover	Endangered
<i>Sistrurus catenatus catenatus</i>	Eastern massasauga	Candidate
<i>Somatochlora hineana</i>	Hine's emerald dragonfly	Endangered

Potential impacts from deployment demonstrations to biological resources could result from noise produced by F-35 aircraft takeoffs and landings. The Proposed Action would result in a temporary increase in noise levels at the airfields at each deployment demonstration location. However, the increased loudness of noise events is expected to be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected at the deployment demonstration locations.

From: Tameka\_Dandridge@fws.gov [[mailto:Tameka\\_Dandridge@fws.gov](mailto:Tameka_Dandridge@fws.gov)]  
Sent: Wednesday, July 01, 2009 11:14 AM  
To: Brown, Charlie J Civ USAF AFCEE AFCEE/TDBS  
Subject: Endangered Species Act Consultation for Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E), Alpena County, Michigan

Mr. Brown,

This is a follow-up to yesterday's telephone conversation regarding the presence of federally listed or proposed endangered or threatened species or critical habitat near your proposed deployment demonstration at the Alpena Combat Readiness Training Center near Alpena (T31N-R7E-S14), Alpena County, Michigan. Our records do not indicate the presence of listed or proposed species or critical habitat near your proposed project.

This precludes the need for further action on this project as required by the Endangered Species Act of 1973, as amended. If the project is modified or new information about the project becomes available that indicates listed species or critical habitat may be affected in a manner or to an extent not previously considered, you should reinitiate consultation with this office.

I also mentioned in our telephone conversation how this information along with section 7 consultations may be initiated online via the Midwest Region's Endangered Species webpage. Please refer to the below websites for additional information on the online section 7 consultation process.

Section 7 Consultation Main Page -

<http://www.fws.gov/midwest/endangered/section7/index.html>

This main Endangered Species Act Section 7 consultation webpage has been designed to provide a broad range of information, and includes links to the following specific pages:

- Section 7(a)(2) Consultation - An explanation of the consultation process
- Section 7(a)(2) Technical Assistance
- Guidelines for Preparing a Biological Assessment
- Section 7(a)(2) Guidance for Specific Species
- Section 7 Consultation Handbook

Section 7(a)(2) Technical Assistance page -

<http://www.fws.gov/midwest/endangered/section7/s7process/index.htm>

This page is designed to guide you through the consultation process step by

step. By following the instructions, agencies can determine their action area, whether listed species may be found within the action area, and if the project may affect listed species.

Federal agencies and non-federal representatives will find several products on the site that can streamline the consultation process. When determining if listed species may be located within a project area, agencies can download county specific species lists for all of the states in Region 3.

Species specific best management practices will also eventually be available. Example letters and templates are available to assist with documenting "no effect" determinations and preparing requests for concurrence on "not likely to adversely affect" determinations.

In addition, refer to the Michigan Department of Natural Resources Endangered Species Assessment website, [www.mcgi.state.mi.us/esa](http://www.mcgi.state.mi.us/esa) and contact

Ms. Lori Sargent at [SargentL@michigan.gov](mailto:SargentL@michigan.gov) for information regarding the protection of threatened and endangered species under state law. State law may require a permit in advance of any work that could potentially damage, destroy or displace state-listed species.

\*\*\*\*\*

Tameka Dandridge  
U.S. Fish & Wildlife Service  
East Lansing Field Office  
2651 Coolidge Rd., Suite 101  
East Lansing, MI 48823  
517-351-8315  
[tameka\\_dandridge@fws.gov](mailto:tameka_dandridge@fws.gov)





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      Wisconsin USFWS  
Green Bay Ecological Services Office  
Louise Clemency, Field Supervisor  
2661 Scott Tower Drive  
New Franken, WI 54229

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
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Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1



**USFWS Green Bay Ecological Services Office Attachment 1**  
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**JSF IOT&E**

**Proposed Action**

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A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

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#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the Green Bay Ecological Services Office Area is Volk Field ANGB. Volk Field ANGB is currently identified as one of the preferred locations for deployment demonstration.

#### **Federally Listed Species**

Volk Field ANGB is located in Juneau County, WI. Federally listed species for Juneau County are listed in Table 1.

#### **Biological Resource impacts**

Based on the limited scope and short duration of the proposed deployment demonstration activities, no significant impacts are expected and only a minimal discussion and analysis are provided for these locations in the EA/OEA.

**Table 1. Federally Listed Animal Species for Juneau County, WI**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<i>Canis lupus</i>	Gray wolf	Endangered
<i>Grus americanus</i>	Whooping crane	Non-essential Experimental Population
<i>Sistrurus catenatus catenatus</i>	Eastern massasauga	Candidate
<i>Lycaeides melissa samuelis</i>	Karner blue butterfly	Endangered

Potential impacts from deployment demonstrations to biological resources could result from noise produced by F-35 aircraft takeoffs and landings. The Proposed Action would result in a temporary increase in noise levels at the airfields at each deployment demonstration location. However, the increased loudness of noise events is expected to be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected at the deployment demonstration locations.



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Green Bay ES Field Office  
2661 Scott Tower Drive  
New Franken, Wisconsin 54229-9565  
Telephone 920/866-1717  
FAX 920/866-1710

July 8, 2009

Charles J. Brown, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager  
Department of the Air Force  
3300 Sidney Brooks  
Brooks City-Base, Texas 78235-5112

re: Environmental Assessment for the  
Joint Strike Fighter (JSF) Initial Operational  
Test and Evaluation (IOT&E)  
Volk Field Air National Guard Base  
Juneau County, Wisconsin

Dear Mr. Brown:

The U.S. Fish and Wildlife Service (Service) has received your letter on June 17, 2009, requesting information for preparation of an Environmental Assessment (EA) of the subject project, in accordance with the National Environmental Policy Act (32 CFR 651.21). You specifically requested confirmation that the list of threatened endangered candidate or proposed species was current and complete, and that we identify any possible adverse impacts affecting these species or critical habitat. The EA is being prepared to analyze impacts expected to result from implementation of the subject project at multiple locations throughout the United States, including Volk Field Air National Guard Base in Juneau County, Wisconsin. Our comments follow.

The list of federally-listed species presented in Attachment 1 to your letter is current and complete. Based upon the information provided for our review, the Service anticipates there will be no significant adverse effects to federally-listed species.

We appreciate the opportunity to respond. Questions pertaining to these comments can be directed to Mr. Joel Trick at 920-866-1737.

Sincerely,

Louise Clemency  
Field Supervisor



**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      U.S. Fish and Wildlife Service  
Nevada Fish & Wildlife Office  
1340 Financial Blvd., Suite 234  
Reno, Nevada 89502

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
- (b) National Environmental Policy Act of 1969.

In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

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CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1
- 3. Figure 2

**USFWS Nevada Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

The Joint Strike Fighter (JSF) program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) phases. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities that would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on Figure 1.

- 1) Basing the F-35 aircraft:  
Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)  
Training and Proficiency Flights:  
R-2508 Complex (Edwards AFB airspace)  
Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu  
Ranges, California  
Nevada Test and Training Range (NTTR), Nevada  
Flight Testing:  
R2508 Complex (Edwards AFB airspace)  
Marine Corps Air Station (MCAS), Yuma Ranges, Arizona  
National Training Center (NTC), Fort Irwin, California  
NAWCWD, China Lake, California  
NAWCWD, Point Mugu Ranges, California  
NTTR, Nevada  
Utah Test and Training Range (UTTR), Utah  
White Sands Missile Range (WSMR), New Mexico
- 3) Deployment Demonstrations:  
Alpena Combat Readiness Training Center (CRTC), Michigan  
Edwards AFB  
Eglin AFB, FL  
Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms,  
California  
MCAS Yuma, Arizona  
NAS Lemoore, California  
Carriers on the NAWCWD Point Mugu Ranges

## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB. No F-35 aircraft landings/takeoffs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of an emergency.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur, with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.



Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the Nevada Fish and Wildlife Office area is the UTTR (Figure 2). Activities proposed for UTTR include test flights. Test flight activities would include support aircraft flights and air-to-air missile tests. Approximately 210 F-35 sorties would be flown approximately 420 hours during year 1 and approximately 560 F-35 sorties would be flown approximately 1,100 hours during year 2 in the UTTR airspace. Approximately five aerial targets (drones) would be launched, and five air-to-air live missile shots would occur. The drones would be launched from and recovered at UTTR. No other ground activities would occur at UTTR.

#### **Federally Listed Species**

UTTR is located in Box Elder and Tooele counties, Utah, but the associated airspace areas that would also be used during JSF IOT&E extend into Juab and Millard counties, Utah, and Elko and White Pine counties, Nevada. Federally listed species for the Nevada

counties are listed in Table 1. A separate letter has been submitted to the USFWS in Utah for federally listed species in the Utah counties.

**Table 1. Federally Listed Animal Species for the UTTR Area, Nevada (Elko and White Pine Counties)**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<b>Fish</b>		
<i>Lepidomeda albivallis</i>	White River spinedace	Endangered
<i>Empetrichthys latos</i>	Pahrump poolfish	Endangered
<i>Oncorhynchus clarkii henshawi</i>	Lahontan cutthroat trout	Threatened
<i>Rhinichthys osculus lethoporus</i>	Independence Valley speckled dace	Endangered
<i>Rhinichthys osculus oligoporus</i>	Clover Valley speckled dace	Endangered
<i>Salvelinus confluentus</i>	Bull trout	Threatened
<b>Reptiles and Amphibians</b>		
<i>Rana luteiventris</i>	Columbia spotted frog	Candidate
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate

## **Biological Resource Impacts**

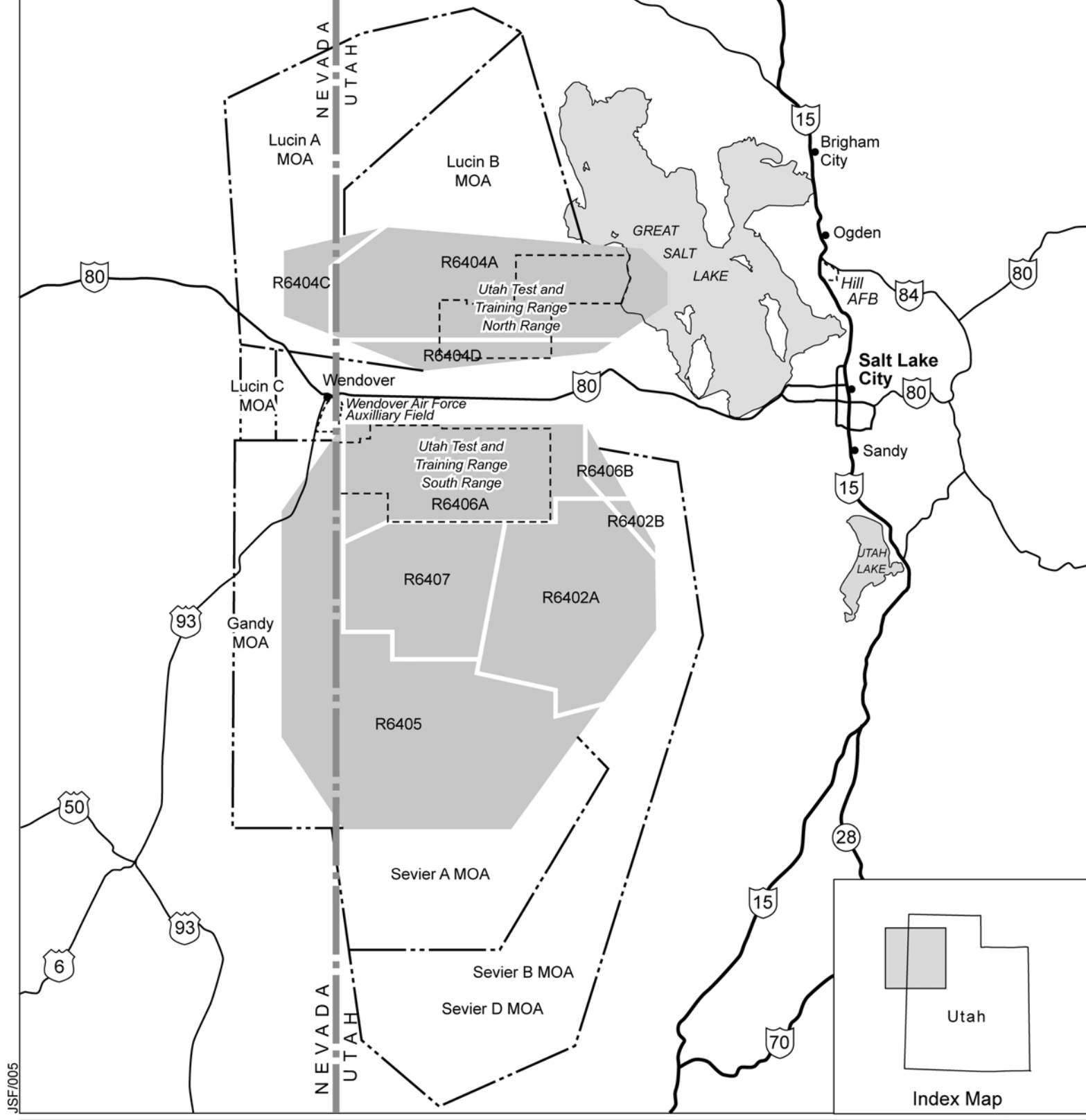
Potential impacts to biological resources in the test ranges could occur from F-35 aircraft overflights. Aircraft noise and visual exposure to aircraft present the potential to affect animals in the test range areas. No significant impacts to biological resources are expected.

Noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout test ranges at subsonic and supersonic levels and is recognized as a routine component of military activities. Although range flight activities may have the potential to impact wildlife, many species have shown an ability to acclimate to high noise levels, including sonic booms. This finding is supported by research conducted by the U.S. Air Force on the effects of jet noise from aircraft, including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft-related noise exposure and do not exhibit significant adverse effects related to their hearing, behavior, or heart rate. Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout ranges where aircraft operations occur. Therefore, impacts from range flight operations are considered less than significant.

F-35 aircraft flying activities would adhere to all existing range restrictions including minimum heights AGL, aircraft overflight restricted areas, supersonic flight areas, and

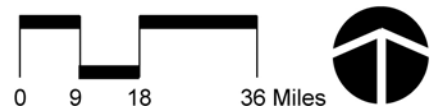
temporal restrictions. Therefore JSF IOT&E activities would not present a new impact to wildlife, but would be consistent with the existing environment for these potential impacts to wildlife on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Therefore, overall range activity would not be expected to change significantly under the Proposed Action. Overflight noise from the F-35 is not expected to be louder than other military jets. No significant impacts to wildlife from the Proposed Action would be expected.

U.S. Air Force fighters currently fly 90 percent of the total sorties flown on the UTTR on an annual basis. F-35 aircraft activity would be consistent with current jet fighter activity on the range. JSF activities proposed for UTTR also include a total of five aerial target launches and air-to-air live missile shots. Use of existing target launch sites and target areas would not be expected to have a significant impact on biological resources on the UTTR. Target activity would occur on the UTTR range area in Utah, not in Nevada.



**EXPLANATION**

- State Boundary
- Restricted Airspace
- Military Installation
- 80 Interstate Highway
- MOA Military Operations Area
- MOA Boundary



**Utah Test and Training Range, Utah and Nevada**

**Figure 2**





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      New Mexico USFWS  
New Mexico Ecological Services Field Office  
Section 7 Coordinator  
2105 Osuna Road NE  
Albuquerque, NM 87113

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
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CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

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**USFWS New Mexico Ecological Services Field Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

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    - Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges, California
    - Nevada Test and Training Range (NTTR), Nevada
  - Flight Testing:
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    - National Training Center (NTC), Fort Irwin, California
    - NAWCWD, China Lake, California
    - NAWCWD, Point Mugu Ranges, California
    - NTTR, Nevada
    - Utah Test and Training Range (UTTR), Utah
    - White Sands Missile Range (WSMR), New Mexico
- 3) Deployment Demonstrations:
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A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

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Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the New Mexico Ecological Services Field Office Area is the WSMR (Figure 2). WSMR is proposed as an alternate location to UTTR for air-to-air missile tests. Activities proposed for this location are test flights. Flight tests at WSMR would include F-35 aircraft flights, support aircraft flights, aerial target launches, and air-to-air live missile shots. Approximately 10 F-35 sorties would be flown approximately 20 hours in the WSMR airspace during each of the two test years. Approximately five aerial targets (drones) would be launched, and five air-to-air live missile shots would occur. The drones would be launched from and recovered at WSMR. No other ground activities would occur at WSMR.

#### **Federally Listed Species**

WSMR is located within Dona Ana, Lincoln, Otero, Sierra, and Socorro counties, NM. Federally listed species potentially occurring in the WSMR area are listed in Table 1.

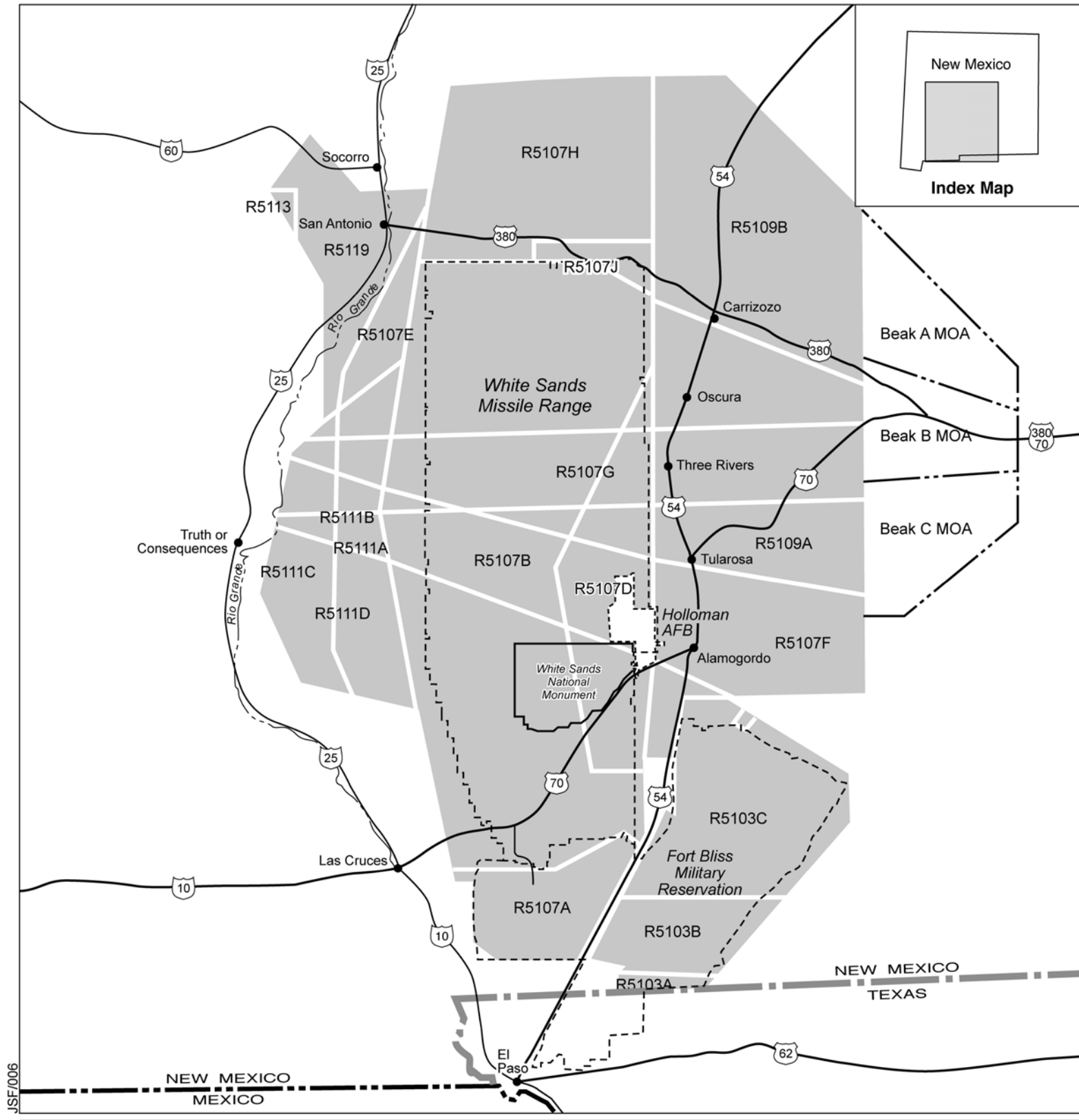
**Table 1. Federally Listed Animal Species for the WSMR Area, New Mexico (Dona Ana, Lincoln, Otero, Sierra, and Socorro Counties)**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Federal Status</b>
<b>Invertebrates</b>		
<i>Dereonectes neomericana</i>	Bonita diving beetle	Special Concern
<i>Lytta mirifica</i>	Anthony blister beetle	Special Concern
<b>Fish</b>		
<i>Cyprinodon tularosa</i>	White Sands pupfish	Special Concern
<b>Birds</b>		
<i>Accipiter gentilis</i>	northern goshawk	Special Concern
<i>Charadrius alexandrinus nivosus</i>	western snowy plover	Threatened
<i>Charadrius melodus circumcinctus</i>	piping plover	Threatened
<i>Empidonax traillii extimus</i>	southwestern willow flycatcher	Endangered
<i>Falco femoralis septentrionalis</i>	northern aplomado falcon	Endangered
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Delisted
<i>Sterna antillarum athalassos</i>	interior least tern	Endangered
<i>Strix occidentalis lucida</i>	Mexican spotted owl	Threatened
<b>Mammals</b>		
<i>Canis lupus baileyi</i>	Mexican gray wolf	Endangered
<i>Cynomys ludovicianus arizonensis</i>	Arizona black-tailed prairie dog	Special Concern
<i>Neotoma micropus leucophaeus</i>	White Sands woodrat	Special Concern
<i>Zapus hudsonius luteus</i>	New Mexico meadow jumping mouse	Candidate

## Biological Resource Impacts

Potential impacts to biological resources from the proposed JSF IOT&E activities at WSMR would be limited to those from F-35 aircraft overflights and from weapons missions. No significant impacts to biological resources are expected. JSF IOT&E activities proposed for WSMR would be similar to those that would occur at WSMR as part of the JSF DT. DT activities proposed for WSMR and analyzed in the DT EA/OEA entail a higher level of activity at WSMR than would occur under IOT&E. DT activities proposed for WSMR include more aircraft flights than would occur as part of IOT&E. A maximum of 23 F-35 sorties would occur during one year under DT versus a maximum of 10 F-35 sorties under IOT&E. DT also includes more air-to-air missile tests, and more target (drone) launches than proposed for IOT&E. A total of 8 to 11 aerial target launches and air-to-air live missile shots would occur under DT versus a total of 5 under IOT&E. DT activities are expected to occur during a three-year time frame at WSMR. IOT&E activities would occur over two years. As currently scheduled, the years of DT activities and the years of IOT&E activities proposed for WSMR would not overlap.

Impacts to biological resources at WSMR were analyzed in the DT EA/OEA. The DT EA/OEA concluded that biological species are expected to already be acclimated to the noise generated from ongoing activities conducted at WSMR. Air-to-air missile programs and target system launches are routine activities at WSMR. No significant impacts to biological/natural resources were expected over the three-year test period for the proposed JSF DT Program. Based on the similar nature of IOT&E activities and the lower activity level during a shorter time frame, no significant impacts to biological resources from IOT&E activities at WSMR would be expected.



# EXPLANATION

- State Boundary
- U.S. Border
- Restricted Airspace
- Military Installation
- U.S. Highway
- Interstate Highway
- MOA Military Operations Area
- MOA Boundary

## White Sands Missile Range, New Mexico

Figure 2





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      Panama City Field Office  
Section 7 Coordinator  
1601 Balboa Avenue  
Panama City, FL 32405

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
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National Training Center (NTC), Fort Irwin, California  
NAWCWD, China Lake, California  
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Utah Test and Training Range (UTTR), Utah  
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- 3) Deployment Demonstrations:  
Alpena Combat Readiness Training Center (CRTC), Michigan  
Edwards AFB  
Eglin AFB, FL  
Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms,  
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## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB. No F-35 aircraft landings/takeoffs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of an emergency.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur, with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.



Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the Panama City Field Office Area is Eglin AFB. Eglin AFB is currently identified as one of the preferred locations for a deployment demonstration. However, the activity proposed for Elgin AFB is different from the other deployment demonstrations as described above. The activity at Eglin AFB would consist of F-35 aircraft being flown between the Main Base airfield on Eglin AFB to Duke Field on Eglin AFB prior to the aircraft being flown to Edwards AFB, CA, for use for IOT&E activities in the western U.S.

#### **Federally Listed Species**

Both the Main Base and Duke Field on Eglin AFB are located in Okaloosa County. Federally listed species for Okaloosa County are listed in Table 1.

**Table 1. Federally Listed Animal Species for Okaloosa County, FL**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<b>Invertebrates</b>		
<i>Fusconaia escambia</i>	Narrow pigtoe (mussel)	Candidate
<i>Hamiota australis</i>	Southern sandshell (mussel)	Candidate
<i>Villosa choctawensis</i>	Choctaw bean (mussel)	Candidate
<b>Fish</b>		
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	Threatened
<i>Etheostoma okaloosae</i>	Okaloosa darter	Endangered
<b>Reptiles and Amphibians</b>		
<i>Ambystoma cingulatum</i>	Flatwoods salamander	Threatened
<i>Caretta caretta</i>	Loggerhead turtle	Threatened
<i>Chelonia mydas</i>	Green turtle	Endangered
<i>Dermochelys coriacea</i>	Leatherback turtle	Endangered
<i>Drymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Eretmochelys imbricata</i>	Hawksbill turtle	Endangered
<i>imbricata</i>		
<i>Lepidochelys kempii</i>	Kemp's ridley turtle	Endangered
<b>Birds</b>		
<i>Calidris canutus</i>	Red knot	Candidate
<i>Charadrius melodus</i>	Piping plover	Threatened
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered
<b>Mammals</b>		
<i>Peromyscus polionotus</i>	Choctawhatchee beach mouse	Endangered
<i>allophrys</i>		
<i>Trichechus manatus</i>	West Indian manatee	Endangered
<i>latirostris</i>		

### **Biological Resource Impacts**

Based on the limited scope and duration of the proposed deployment demonstration activities, no significant impacts are expected and only a minimal discussion and analysis are provided for these locations in the EA/OEA.

Potential impacts from deployment demonstrations to biological resources could result from noise produced by F-35 aircraft takeoffs and landings. The Proposed Action would result in a temporary increase in noise levels at the airfields at each deployment demonstration location. However, the increased loudness of noise events is expected to be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected at the deployment demonstration locations.





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR                      Sacramento USFWS  
   San Joaquin Valley Branch  
   SJVB Section 7 Coordinator  
   2800 Cottage Way  
   Room W-2605  
   Sacramento, CA 95825

FROM: HQ AFCEE/BC  
             3300 Sidney Brooks  
             Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
- (b) National Environmental Policy Act of 1969.

In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "CJB", followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1

**USFWS Sacramento Field Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

The Joint Strike Fighter (JSF) program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) phases. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities that would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on Figure 1.

- 1) Basing the F-35 aircraft:  
Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)  
Training and Proficiency Flights:  
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Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu  
Ranges, California  
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Carriers on the NAWCWD Point Mugu Ranges

## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

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#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the Sacramento Field Office Area is NAS Lemoore. NAS Lemoore is currently identified as one of the preferred locations for deployment demonstration.

#### **Federally Listed Species**

NAS Lemoore is located within Kings County, CA. Federally listed species for Kings County are listed in Table 1.

#### **Biological Resource Impacts**

Based on the limited scope and duration of the proposed deployment demonstration activities, no significant impacts are expected and only a minimal discussion and analysis are provided for these locations in the EA/OEA.

**Table 1. Federally Listed Animal Species for Kings County, CA**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<i>Branchinecta lynchi</i>	vernal pool fairy shrimp	Threatened
<i>Desmocerus californicus dimorphus</i>	valley elderberry longhorn beetle	Threatened
<i>Lepidurus packardii</i>	vernal pool tadpole shrimp	Endangered
<i>Ambystoma californiense</i>	California tiger salamander, central population	Threatened
<i>Rana aurora draytonii</i>	California red-legged frog	Threatened
<i>Gambelia (=Crotaphytus) sila</i>	blunt-nosed leopard lizard	Endangered
<i>Thamnophis gigas</i>	giant garter snake	Threatened
<i>Gymnogyps californianus</i>	California condor	Endangered
<i>Dipodomys ingens</i>	giant kangaroo rat	Endangered
<i>Dipodomys nitratooides exilis</i>	Fresno kangaroo rat	Endangered
<i>Dipodomys nitratooides nitratooides</i>	Tipton kangaroo rat	Endangered
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Endangered

Potential impacts from deployment demonstrations to biological resources could result from noise produced by F-35 aircraft takeoffs and landings. The Proposed Action would result in a temporary increase in noise levels at the airfields at each deployment demonstration location. However, the increased loudness of noise events is expected to be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected at the deployment demonstration locations.







**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      Nevada USFWS  
Southern Nevada Field Office  
Section 7 Coordinator  
4701 North Torrey Pines Drive  
Las Vegas, NV 89130

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
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In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

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AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1
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**USFWS Southern Nevada Field Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

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#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the Southern Nevada Field Office Area is the NTTR (Figure 2). Activities proposed for this location include both pilot training and proficiency flights and test flights. Test flight activities at NTTR would include support aircraft flights. Captive carry weapon and weapon release missions would be conducted. Approximately 270 F-35 sorties would be flown approximately 310 hours during year 1 and approximately 700 F-35 sorties would be flown approximately 810 hours during year 2 in the NTTR airspace. No ground activities would occur at NTTR. IOT&E flight test activities at NTTR include three missions that would include releases of inert weapons.

#### **Federally Listed Species**

NTTR is located within Clark, Lincoln, and Nye counties, Nevada, and its associated airspace extends into Washington and Iron counties Utah. The federally listed animal

species for the Nevada counties are listed in Table 1. A separate letter has been submitted to the USFWS in Utah for federally listed species in the Utah counties.

**Table 1. Federally Listed Animal Species for the NTTR Area, Nevada**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<b>Invertebrates</b>		
<i>Ambrysus amargosus</i>	Ash Meadows naucorid	Threatened
<b>Fish</b>		
<i>Lepidomeda mollispinis pratensis</i>	Big Spring spinedace	Threatened
<i>Lepidomeda albivallis</i>	White River spinedace	Endangered
<i>Chrenichthys nevadae</i>	Railroad Valley springfish	Threatened
<i>Chrenichthys baileyi grandis</i>	White River springfish	Endangered
<i>Chrenichthys baileyi baileyi</i>	Hiko White River springfish	Endangered
<i>Cyprinodon diabolis</i>	Devil's Hole pupfish	Endangered
<i>Cyprinodon nevadensis mionectes</i>	Ash Meadows Amargosa pupfish	Endangered
<i>Cyprinodon nevadensis pectoralis</i>	Warm Springs pupfish	Endangered
<i>Moapa coriacea</i>	Moapa dace	Endangered
<i>Gila cypha</i>	Humpback chub	Endangered
<i>Gila elegans</i>	Bonytail chub	Endangered
<i>Gila robusta jordani</i>	Pahranagat roundtail chub	Endangered
<i>Gila robusta seminude</i>	Virgin River chub	Endangered
<i>Empetrichthys latos</i>	Pahrump poolfish	Endangered
<i>Oncorhynchus clarkii henshawi</i>	Lahontan cutthroat trout	Threatened
<i>Plagopterus argentissimus</i>	Woundfish	Endangered
<i>Ptychocheilus lucius</i>	Colorado pikeminnow	Endangered
<i>Rhinichthys osculus nevadensis</i>	Ash Meadows speckled dace	Endangered
<i>Xyrauchen texanus</i>	Razorback sucker	Endangered
<b>Reptiles and Amphibians</b>		
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<i>Rana luteiventris</i>	Columbia spotted frog	Candidate
<i>Rana onca</i>	Relict leopard frog	Candidate
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered

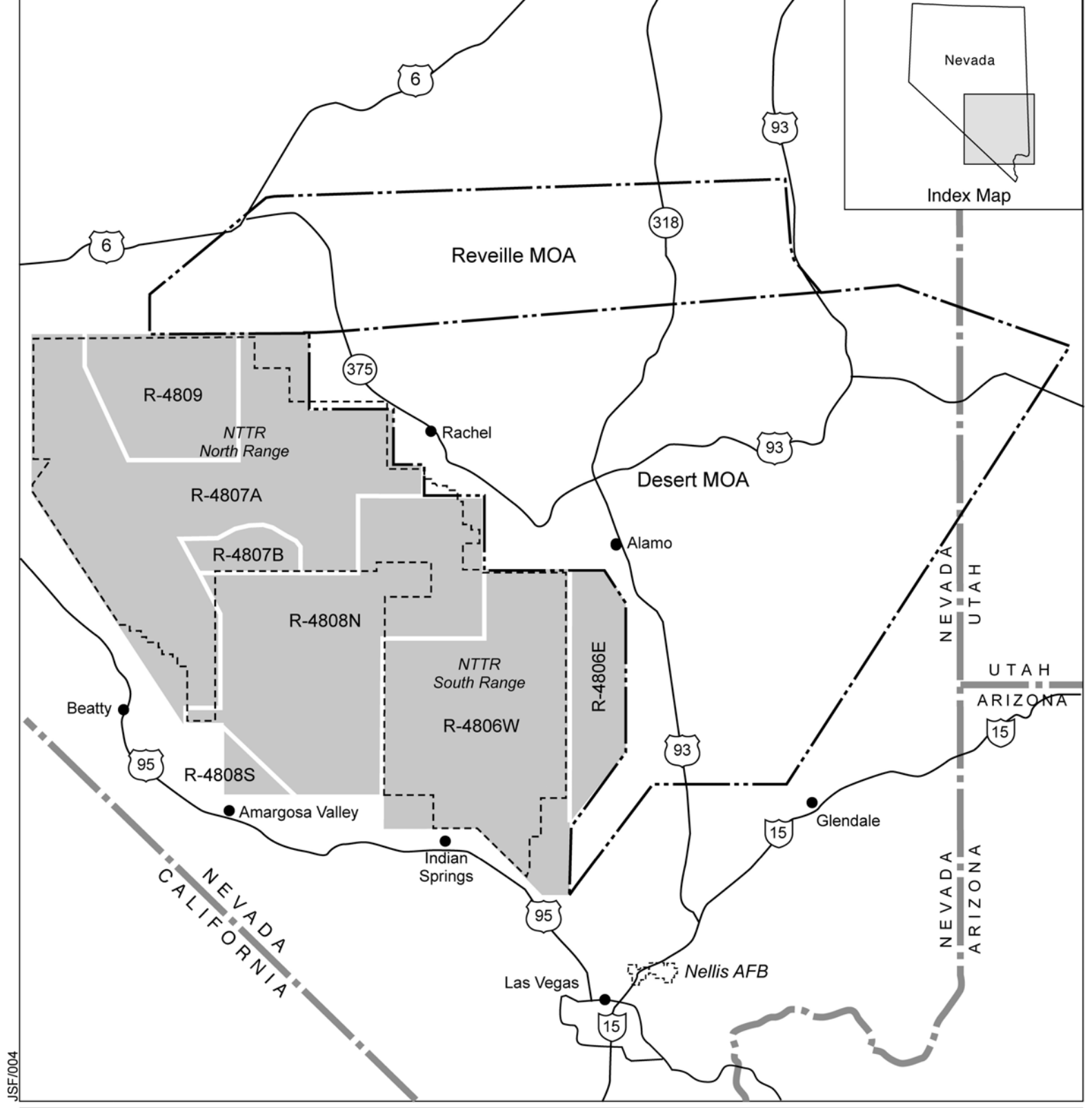
## **Biological Resource Impacts**

Potential impacts to biological resources in the test ranges could occur from F-35 aircraft overflights. Aircraft noise and visual exposure to aircraft present the potential to affect animals in the test range areas. No significant impacts to biological resources are expected.

Noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout test ranges at subsonic and supersonic levels and is recognized as a routine component of military activities. Although range flight activities may have the potential to impact wildlife, many species have shown an ability to acclimate to high noise levels, including sonic booms. This finding is supported by research conducted by the U.S. Air Force on the effects of jet noise from aircraft, including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft-related noise exposure and do not exhibit significant adverse effects related to their hearing, behavior, or heart rate. Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout ranges where aircraft operations occur. Therefore, impacts from range flight operations are considered less than significant.

F-35 aircraft flying activities would adhere to all existing range restrictions including minimum heights AGL, aircraft overflight restricted areas, supersonic flight areas, and temporal restrictions. Therefore JSF IOT&E activities would not present a new impact to wildlife, but would be consistent with the existing environment for these potential impacts to wildlife on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Therefore, overall range activity would not be expected to change significantly under the Proposed Action. Overflight noise from the F-35 is not expected to be louder than other military jets. No significant impacts to wildlife from the Proposed Action would be expected.

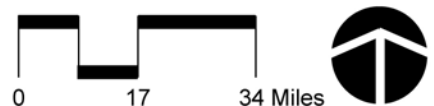
The USFWS programmatic Biological Opinion, issued on June 17, 2003, concluded that training activities at NTTR would not jeopardize the continued existence of the desert tortoise or destroy or adversely modify critical habitat. JSF IOT&E activities proposed for NTTR also include three air-to-ground weapons releases. Air-to-ground releases would entail use of inert weapons. Under the proposed action, F-35s would use existing target areas on NTTR for ordnance delivery. The three air-to-ground releases of inert weapons on existing target areas would not be expected to have a significant impact to biological resources on NTTR.



**EXPLANATION**

- |  |                       |  |                              |
|--|-----------------------|--|------------------------------|
|  | State Boundary        |  | MOA Military Operations Area |
|  | Restricted Airspace   |  | MOA Boundary                 |
|  | Military Installation |  |                              |
|  | U.S. Highway          |  |                              |
|  | Interstate Highway    |  |                              |
|  | State Highway         |  |                              |

**Nevada Test and Training Range, Nevada and Utah**



**Figure 2**







**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      Tucson Sub Office  
Section 7 Coordinator  
201 N. Bonita, Suite 141  
Tucson, AZ 85745

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
- (b) National Environmental Policy Act of 1969.

In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "CJB", with a long horizontal line extending to the right.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1
- 3. Figure 2

**USFWS Tucson Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

The Joint Strike Fighter (JSF) program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) phases. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities that would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on Figure 1.

- 1) Basing the F-35 aircraft:  
Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)  
Training and Proficiency Flights:  
R-2508 Complex (Edwards AFB airspace)  
Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu  
Ranges, California  
Nevada Test and Training Range (NTTR), Nevada  
Flight Testing:  
R2508 Complex (Edwards AFB airspace)  
Marine Corps Air Station (MCAS), Yuma Ranges, Arizona  
National Training Center (NTC), Fort Irwin, California  
NAWCWD, China Lake, California  
NAWCWD, Point Mugu Ranges, California  
NTTR, Nevada  
Utah Test and Training Range (UTTR), Utah  
White Sands Missile Range (WSMR), New Mexico
- 3) Deployment Demonstrations:  
Alpena Combat Readiness Training Center (CRTC), Michigan  
Edwards AFB  
Eglin AFB, FL  
Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms,  
California  
MCAS Yuma, Arizona  
NAS Lemoore, California  
Carriers on the NAWCWD Point Mugu Ranges

## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB. No F-35 aircraft landings/takeoffs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of an emergency.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur, with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

JSF IOT&E locations within the Tucson Sub Office Area are limited to MCAS Yuma and its associated ranges in Arizona (Figure 2). The MCAS Yuma Ranges include the western portion of the Barry Goldwater Range and the Kofa Range in Arizona and the Chocolate Mountain Range in California. JSF IOT&E activities proposed for MCAS Yuma Ranges include test flights and a possible deployment demonstration. A maximum of approximately 330 F-35 sorties would be flown a maximum of approximately 480 hours during year 1 and a maximum of approximately 530 F-35 sorties would be flown a maximum of approximately 780 hours during year 2. This is a maximum activity for all three MCAS Yuma Ranges combined; a breakdown of activity by the three ranges has not yet been developed. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for MCAS Yuma test flights. In addition, MCAS Yuma is currently identified as one of the preferred locations for deployment demonstration. During test flight activities, F-35 aircraft would not land or take off at MCAS Yuma runways, except in an emergency situation.

However, during the deployment demonstration activity F-35 aircraft would use the runway.

## Federally Listed Species

The MCAS Yuma Ranges are located in La Paz and Yuma counties, Arizona, and Imperial County, California. Federally listed species for these Arizona counties are listed in Table 1. A separate letter has been submitted to the USFWS in Carlsbad, California, for federally listed species in Imperial County.

**Table 1. Federally Listed Animal Species MCAS Yuma Ranges Area, Arizona**

<i>Scientific Name</i>	<i>Common Name</i>	<i>Status</i>
<b>Fish</b>		
<i>Cyprinodon macularis</i>	Desert pupfish	Endangered
<i>Gila elegans</i>	Bonytail chub	Endangered
<i>Poeciliopsis occidentalis occidentalis</i>	Gila topminnow	Endangered
<i>Ptychocheilus lucius</i>	Colorado squawfish	Endangered
<i>Xyrauchen texanus</i>	Razorback sucker	Endangered
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Haliaeetus leucocephalus</i>	Bald eagle	Threatened <sup>(1)</sup>
<i>Pelecanus occidentalis</i>	Brown pelican	Endangered
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered
<b>Mammals</b>		
<i>Antilocapra americana sonoriensis</i>	Sonoran pronghorn	Endangered
<i>Leptonycteris curasoae yerbabuenae</i>	Lesser long-nosed bat	Endangered
<sup>(1)</sup> Delisted 2007; threatened status reinstated for desert nesting birds.		

## Biological Resource Impacts

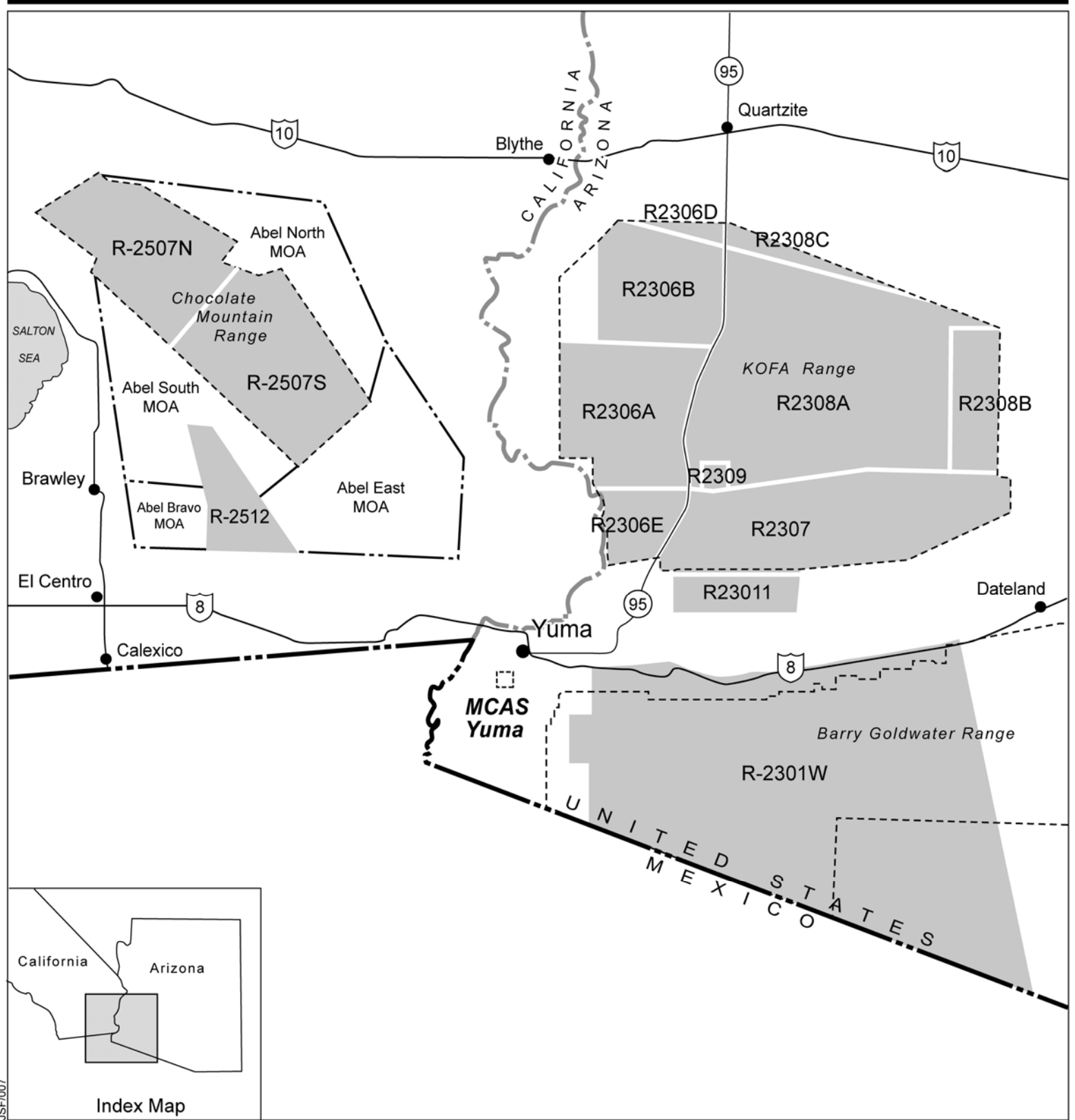
Test Range Activities. Potential impacts to biological resources in the test ranges could occur from F-35 aircraft overflights. Aircraft noise and visual exposure to aircraft present the potential to affect animals in the test range areas. No significant impacts to biological resources are expected.

Noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout test ranges at subsonic and supersonic levels and is recognized as a routine component of military activities. Although range flight activities may have the potential to impact wildlife, many species have shown an ability to acclimate to high noise levels, including sonic booms. This finding is supported by research conducted by the U.S. Air Force on the effects of jet noise from aircraft, including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft-related noise exposure and do not exhibit significant adverse effects related to their hearing, behavior, or heart rate. Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout ranges where aircraft operations occur. Therefore, impacts from range flight operations are considered less than significant.

F-35 aircraft flying activities would adhere to all existing range restrictions including minimum heights AGL, aircraft overflight restricted areas, supersonic flight areas, and temporal restrictions. Therefore, JSF IOT&E activities would not present a new impact to wildlife, but would be consistent with the existing environment for these potential impacts to wildlife on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Therefore, overall range activity would not be expected to change significantly under the Proposed Action. Overflight noise from the F-35 is not expected to be louder than other military jets. No significant impacts to wildlife from the Proposed Action would be expected.

Deployment Demonstration. Based on the limited scope and short duration of the proposed deployment demonstration activities, no significant impacts are expected and only a minimal discussion and analysis are provided for these locations in the EA/OEA.

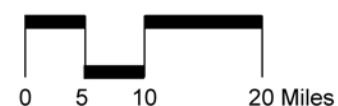
Potential impacts from deployment demonstrations to biological resources could result from noise produced by F-35 aircraft takeoffs and landings. The Proposed Action would result in a temporary increase in noise levels at the airfields at each deployment demonstration location. However, the increased loudness of noise events is expected to be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected at the deployment demonstration locations.



## EXPLANATION

- |  |                       |  |     |                          |
|--|-----------------------|--|-----|--------------------------|
|  | State Boundary        |  | MOA | Military Operations Area |
|  | U.S. Border           |  |     | MOA Boundary             |
|  | Restricted Airspace   |  |     |                          |
|  | Military Installation |  |     |                          |
|  | Interstate Highway    |  |     |                          |
|  | State Highway         |  |     |                          |

## Marine Corps Air Station, Yuma, and Ranges, Arizona and California



**Figure 2**







**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      Utah USFWS  
Ecological Services Field Office  
Section 7 Coordinator  
2369 West Orton Circle, Suite 50  
West Valley City, Utah 84119

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
- (b) National Environmental Policy Act of 1969.

In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

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CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1
- 3. Figure 2
- 4. Figure 3

**USFWS Utah Ecological Services Field Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

The Joint Strike Fighter (JSF) program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) phases. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities that would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on Figure 1.

- 1) Basing the F-35 aircraft:  
Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)  
Training and Proficiency Flights:  
R-2508 Complex (Edwards AFB airspace)  
Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu  
Ranges, California  
Nevada Test and Training Range (NTTR), Nevada  
Flight Testing:  
R2508 Complex (Edwards AFB airspace)  
Marine Corps Air Station (MCAS), Yuma Ranges, Arizona  
National Training Center (NTC), Fort Irwin, California  
NAWCWD, China Lake, California  
NAWCWD, Point Mugu Ranges, California  
NTTR, Nevada  
Utah Test and Training Range (UTTR), Utah  
White Sands Missile Range (WSMR), New Mexico
- 3) Deployment Demonstrations:  
Alpena Combat Readiness Training Center (CRTC), Michigan  
Edwards AFB  
Eglin AFB, FL  
Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms,  
California  
MCAS Yuma, Arizona  
NAS Lemoore, California  
Carriers on the NAWCWD Point Mugu Ranges

## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB. No F-35 aircraft landings/takeoffs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of an emergency.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur, with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

The JSF IOT&E location within the Utah Ecological Services Field Office Area is the UTTR (Figure 2) and a portion of the NTTR (Figure 3). Activities proposed for UTTR include test flights. Test flight activities would include support aircraft flights and air-to-air missile tests. Approximately 210 F-35 sorties would be flown approximately 420 hours during year 1 and approximately 560 F-35 sorties would be flown approximately 1,100 hours during year 2 in the UTTR airspace. Approximately five aerial targets (drones) would be launched, and five air-to-air live missile shots would occur. The drones would be launched from and recovered at UTTR. No other ground activities would occur at UTTR.

Activities proposed for NTTR include both pilot training and proficiency flights and test flights. Test flight activities at NTTR would include support aircraft flights. Captive carry weapon and weapon release missions would be conducted. Approximately 270 F-35 sorties would be flown approximately 310 hours during year 1 and approximately 700 F-35 sorties would be flown approximately 810 hours during year 2 in the NTTR

airspace. No ground activities would occur at NTTR. IOT&E flight test activities at NTTR include three missions that would include releases of inert weapons. Because of the limited area of the NTTR airspace within Utah, the amount of these activities occurring in Utah would be minimal.

### Federally Listed Species

UTTR is located in Box Elder and Tooele counties, Utah, but the associated airspace and areas that would also be used during JSF IOT&E extend into Juab and Millard counties, Utah, and Elko and White Pine counties, Nevada. Federally listed species for the Utah counties are listed in Table 1. A separate letter has been submitted to the USFWS in Reno, Nevada, for federally listed species in these Nevada counties.

**Table 1. Federally Listed Animal Species for the UTTR Area, Utah (Box Elder, Tooele, Juab, and Millard Counties)**

Scientific Name	Common Name	Status
<b>Fish</b>		
<i>Oncorhynchus clarkii henshawi</i>	Lahontan cutthroat trout	Threatened
<i>Chasmistes liorus</i>	June sucker	Endangered
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<b>Mammals</b>		
<i>Cynomys parvidens</i>	Utah prairie dog	Threatened

NTTR is located within Clark, Lincoln, and Nye counties, Nevada, but its associated airspace areas extend into Washington and Iron counties, Utah. The federally listed animal species for the Utah counties are listed in Table 2. A separate letter has been submitted to the USFWS in Southern Nevada for federally listed species in these Nevada counties.

### Biological Resource Impacts

Potential impacts to biological resources in the test ranges could occur from F-35 aircraft overflights. Aircraft noise and visual exposure to aircraft present the potential to affect animals in the test range areas. No significant impacts to biological resources are expected.

Noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout test ranges at subsonic and supersonic levels and is recognized as a routine component of military activities. Although range flight activities may have the potential to impact wildlife, many species have shown an ability to acclimate to high noise levels, including sonic booms. This finding is supported by research conducted by the U.S. Air Force on the effects of jet noise from aircraft, including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft-related noise exposure and

**Table 2. Federally Listed Animal Species for the NTTR Area, Utah (Iron and Washington Counties)**

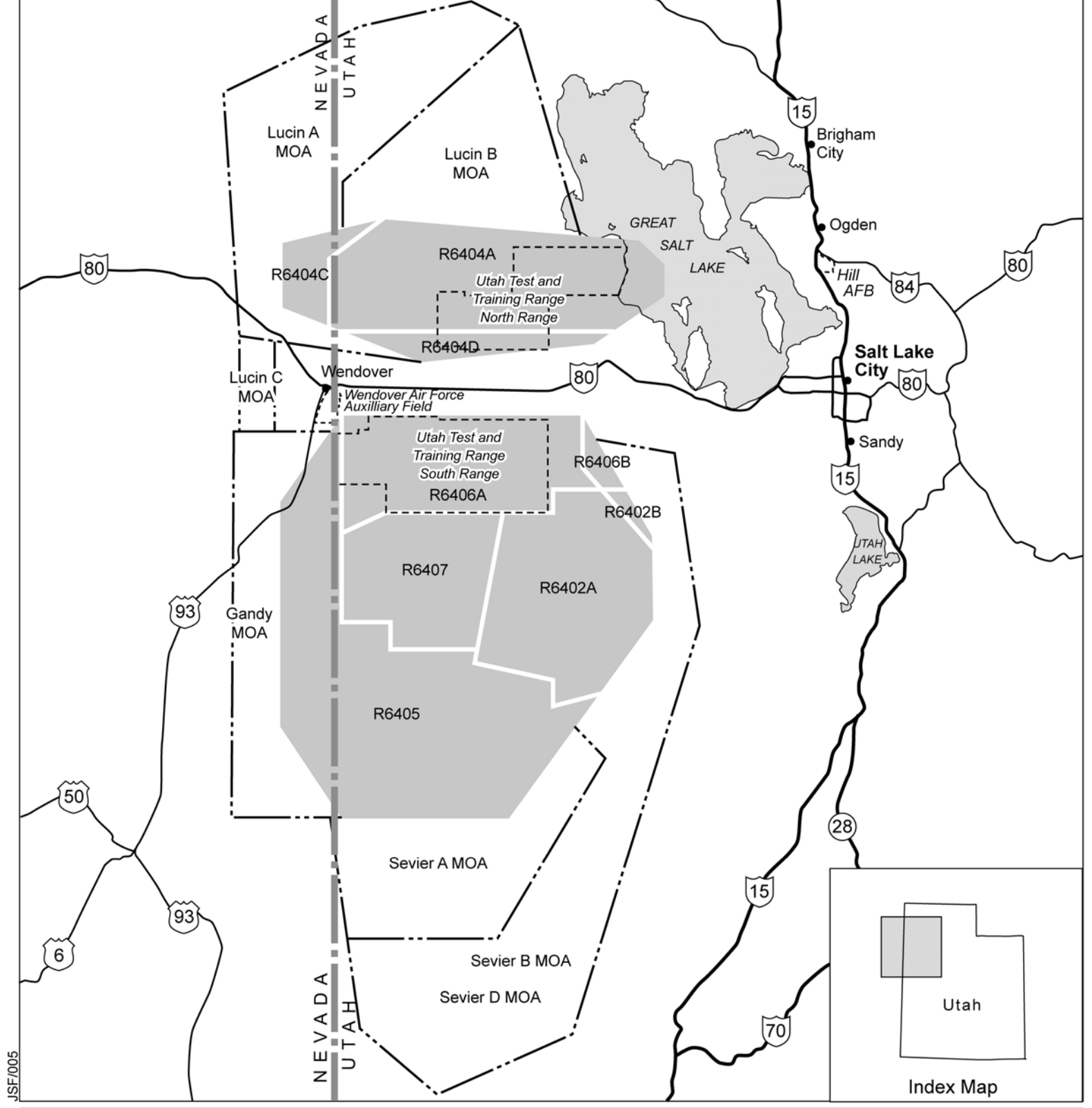
<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<b>Fish</b>		
<i>Gila robusta seminude</i>	Virgin River chub	Endangered
<i>Plagopterus argentissimus</i>	Woundfish	Endangered
<b>Reptiles and Amphibians</b>		
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<i>Rana luteiventris</i>	Columbia spotted frog	Candidate
<i>Rana onca</i>	Relict leopard frog	Candidate
<b>Birds</b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Gymnogyps californianus</i>	California condor	Endangered
<i>Empidonax traillii eximius</i>	Southwestern willow flycatcher	Endangered
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered
<i>Strix occidentalis lucida</i>	Mexican spotted owl	Threatened
<b>Mammals</b>		
<i>Cynomys parvidens</i>	Utah prairie dog	Threatened

do not exhibit significant adverse effects related to their hearing, behavior, or heart rate. Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout ranges where aircraft operations occur. Therefore, impacts from range flight operations are considered less than significant.

F-35 aircraft flying activities would adhere to all existing range restrictions including minimum heights AGL, aircraft overflight restricted areas, supersonic flight areas, and temporal restrictions. Therefore, JSF IOT&E activities would not present a new impact to wildlife, but would be consistent with the existing environment for these potential impacts to wildlife on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Therefore, overall range activity would not be expected to change significantly under the Proposed Action. Overflight noise from the F-35 is not expected to be louder than other military jets. No significant impacts to wildlife from the Proposed Action would be expected.

U.S. Air Force fighters currently fly 90 percent of the total sorties flown on the UTTR on an annual basis. F-35 aircraft activity would be consistent with current jet fighter activity on the range. JSF activities proposed for UTTR also include a total of five aerial target launches and air-to-air live missile shots. Use of existing target launch sites and target areas would not be expected to have a significant impact on biological resources on the UTTR.





# EXPLANATION

- State Boundary
- Restricted Airspace
- Military Installation
- Interstate Highway
- MOA Military Operations Area
- MOA Boundary

Utah Test and Training Range, Utah and Nevada

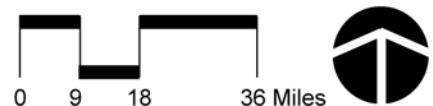
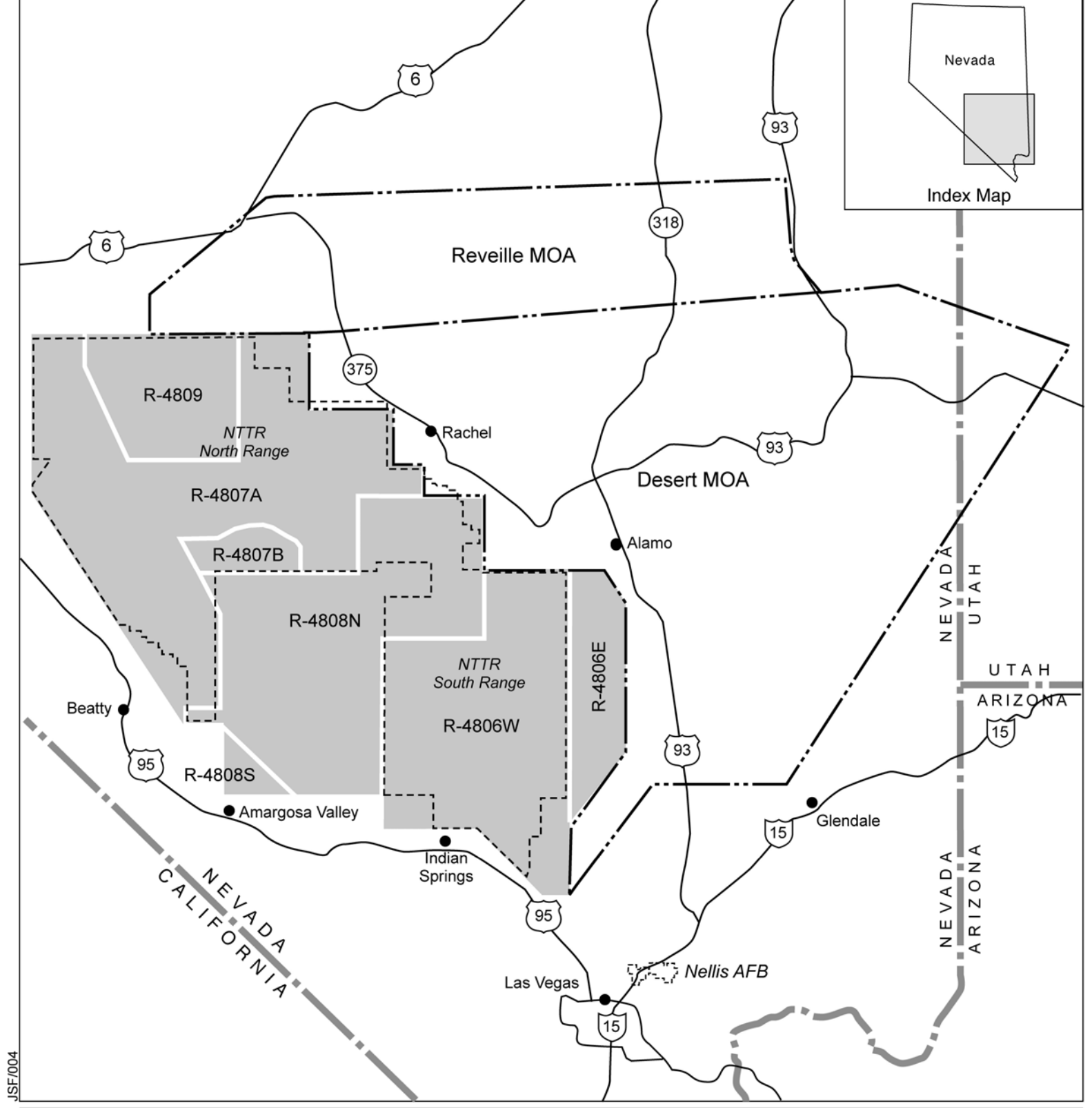


Figure 2



# EXPLANATION

- State Boundary
- Restricted Airspace
- Military Installation
- U.S. Highway
- Interstate Highway
- State Highway
- MOA Military Operations Area
- MOA Boundary

## Nevada Test and Training Range, Nevada and Utah

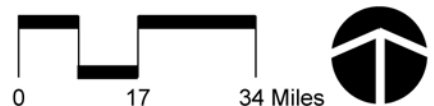


Figure 3



United States Department of the Interior  
FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE  
2369 WEST ORTON CIRCLE, SUITE 50  
WEST VALLEY CITY, UTAH 84119

July 14, 2009

In Reply Refer To

FWS/R6

ES/UT

09-I-0172

Mr. Charles J. Brown, P.E., Project Manager  
Department of the Air Force  
Air Force Center for Engineering and the Environment  
3300 Sidney Brooks  
Brooks City-Base, Texas 78235-5112

RE: Notification of an Environmental Assessment for the Joint Strike Fighter Initial  
Operational Test and Evaluation.

Dear Mr. Brown:

We received your correspondence concerning the Environmental Assessment (EA) for the Initial Operational Test and Evaluation (IOT&E) of the Joint Strike Fighter (JSF) and reviewed the brief description of the proposed EA, which includes a discussion of threatened and endangered species. You requested that our office confirm the accuracy of the threatened, endangered, candidate, and proposed species list and identify any possible adverse impacts affecting species or critical habitat. For future reference, our office maintains a county species list on the internet at <http://www.fws.gov/mountain-prairie/endsp/countylists/utah.pdf>.

You identified the JSF IOT&E locations within our office's jurisdiction as the Utah Test and Training Range (UTTR) and portions of the Nevada Test and Training Range (NTTR). Ground activities associated with the UTTR will take place in Box Elder and Tooele Counties, Utah, while airspace over Juab and Millard Counties, Utah will also be used. Table 1 in your letter lists federally listed species that occur in these four counties. While the four species found in the table are correct, two additional species need to be added to make the table complete. Please add the fat-whorled pond snail (*Stagnicola bonnevillensis*), a candidate species, and the California condor (*Gymnogyps californianus*), an endangered species, to Table 1. The fat-whorled pond snail is found in Box Elder County and the California condor has an experimental, non-essential population in Millard County.

Activities from the NTTR will extend into airspace over Washington and Iron Counties, Utah. Table 2 in your letter lists federally listed species that occur in these two counties. Three species should be deleted from this list: Columbia spotted frog, relict leopard frog, and Yuma clapper rail. The Columbia spotted frog (*Rana luteiventris*) is not a candidate for listing in Utah. Currently, only the Great Basin Distinct Population Segment (DPS), which occurs in Idaho,


Nevada, and Oregon, is a candidate species<sup>1</sup>. The main population is currently listed as a species of concern. In fact, on August 30, 2002, we determined that there is no need to place the Wasatch Front population of the Columbia spotted frog on the endangered species list<sup>2</sup>. The relict leopard frog (*Rana onca*), although a candidate species, is not currently found in Utah. Populations in Utah appear to have been extinct since the 1950s<sup>3</sup>. The Yuma clapper rail (*Rallus longirostris yumaensis*) is not found in Utah; current populations only occur in Arizona<sup>4</sup>. Please delete these species from Table 2.

You conclude that the primary biological resource impact will manifest from aircraft noise and visual exposure. Because the proposed action will adhere to all existing range restrictions and overall range activity would not be expected to change significantly, we agree that the proposed action would not constitute new impacts to wildlife. However, our office would like to review the specific range restrictions for UTTR and NTTR using the most current scientific information ~~and determine if they remain sufficient to minimize wildlife impacts.~~ We also request of copy of the results from the research conducted by the US Air Force on jet noise impacts to desert tortoise mentioned in your letter. Our office does not currently hold a copy of this research and we are interested in reviewing the results.

An additional potential biological resource impact is the ability of ground operations at UTTR (five air-to-air live missile shots) to impact water quality of nearby water bodies. Our office would like additional details that demonstrate that no missile remnants, chemical or physical, would enter an open water body in the Great Basin.

This response has been prepared under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and the Endangered Species Act (16 U.S.C. 1531 et seq.). Thank you for the opportunity to review and comment on this project. If you have any questions or need further information please contact Kevin McAbee, Ecologist, at (801) 975-3330 ext. 143.

Sincerely,



Larry Crist  
Utah Field Supervisor

<sup>1</sup> US Fish and Wildlife Service. 2009. Species Profile for the Columbia spotted frog. Accessed at <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D027> on July 7, 2009.

<sup>2</sup> US Fish and Wildlife Service. 2002. News Release. Accessed at <http://www.fws.gov/mountain-prairie/pressrel/02-24.htm> on July 7, 2009.

<sup>3</sup> Arizona Ecological Services Field Office. 2009. General Species Information for the Relict Leopard Frog. Accessed at <http://www.fws.gov/southwest/es/arizona/Documents/Redbook/Relict%20Leopard%20Frog.pdf> on July 7, 2009.

<sup>4</sup> Arizona Ecological Services Field Office. 2009. General Species Information for the Yuma clapper rail. Accessed at <http://www.fws.gov/southwest/es/arizona/Documents/Redbook/Yuma%20Clapper%20Rail%20RB.pdf> on July 7, 2009.





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR      Ventura USFWS  
                                 VFWO Section 7 Coordinator  
                                 2493 Portola Road, Suite B  
                                 Ventura, CA 93003

FROM: HQ AFCEE/BC  
         3300 Sidney Brooks  
         Brooks City-Base, TX 78235-5112

SUBJECT: Notification of an Environmental Assessment for the Joint Strike Fighter (JSF)  
Initial Operational Test and Evaluation (IOT&E).

References:

- (a) Endangered Species Act of 1973, Section 7(c)(1)
- (b) National Environmental Policy Act of 1969.

In accordance with references above, we are preparing an Environmental Assessment (EA) for the Initial Operational Test and Evaluation of the Joint Strike Fighter. The draft document is scheduled to be issued in June 2009. We request you confirm that the threatened, endangered, candidates, and proposed species list (Table 1 in Attachment 1) is current and complete. Please identify any possible adverse impacts affecting species or critical habitat (see Attachment 1). Attached to this document is a brief description of the proposed EA including a discussion of threatened and endangered species and figures showing the proposed test locations.

We appreciate your assistance with our efforts to identify important biological resources early in the EA development. A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "CJB", with a long horizontal line extending to the right.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments:

- 1. Environmental Assessment Documentation
- 2. Figure 1
- 3. Figure 2
- 4. Figure 3

**USFWS Ventura Field Office Attachment 1**  
**Environmental Assessment Documentation**  
**JSF IOT&E**

**Proposed Action**

The Joint Strike Fighter (JSF) program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) phases. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities that would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on Figure 1.

- 1) Basing the F-35 aircraft:  
Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)  
Training and Proficiency Flights:  
R-2508 Complex (Edwards AFB airspace)  
Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu  
Ranges, California  
Nevada Test and Training Range (NTTR), Nevada  
Flight Testing:  
R2508 Complex (Edwards AFB airspace)  
Marine Corps Air Station (MCAS), Yuma Ranges, Arizona  
National Training Center (NTC), Fort Irwin, California  
NAWCWD, China Lake, California  
NAWCWD, Point Mugu Ranges, California  
NTTR, Nevada  
Utah Test and Training Range (UTTR), Utah  
White Sands Missile Range (WSMR), New Mexico
- 3) Deployment Demonstrations:  
Alpena Combat Readiness Training Center (CRTC), Michigan  
Edwards AFB  
Eglin AFB, FL  
Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms,  
California  
MCAS Yuma, Arizona  
NAS Lemoore, California  
Carriers on the NAWCWD Point Mugu Ranges

## Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB. No F-35 aircraft landings/takeoffs or use of ground facilities at any other location are planned for the JSF IOT&E, except in case of an emergency.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or take off at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur, with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. These aircraft would be used as safety/chase, aerial refueling (tankers), surveillance, transport, and other support activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.



Three types of missions involving weapons would be conducted: captive carry, air-to-ground weapon releases, and air-to-air live missile shots. Captive carry missions would involve flights of the F-35 aircraft where weapons are mounted onto the aircraft, but the weapons are not released. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

#### **Proposed Activities at Locations within this USFWS Area**

JSF IOT&E locations within the Ventura Field Office Area include Edwards AFB, R-2508 Complex, NAWCWD China Lake, NAWCWD Point Mugu, NTC Fort Irwin, and MCAGCC Twentynine Palms (Figures 2 and 3). Activities proposed for these locations are described below.

Edwards AFB. During IOT&E, 16 F-35 aircraft would be staged at Edwards AFB during year 1 and 20 F-35 aircraft during year 2. Existing dedicated JSF facilities and base facilities assets that support other ongoing flight testing and maintenance activities at Edwards AFB would be used. No new facilities or modifications to existing facilities would be required for IOT&E activities. Ground based tests at Edwards AFB would include static operation of the F-35 aircraft engine either on the airfield, on a test stand, or in an enclosed building (hush house). All F-35 IOT&E test range flights would originate and terminate at Edwards AFB. Approximately 1,550 sorties during year 1 and 3,520 sorties during year 2 would originate and terminate at Edwards AFB.

In addition, Edwards AFB is currently identified as one of the preferred locations for deployment demonstration.

R-2508 Complex. The R-2508 Complex includes the R-2508 and R-2515 restricted airspace areas that are associated with Edwards AFB plus adjacent military operations areas (MOAs) (see Figure 2). These areas would be used for test range activities including both pilot training and proficiency flights and test flights. No weapons missions are proposed for R-2508 Complex test flights. Approximately 540 F-35 sorties would be flown approximately 860 hours during year 1 and approximately 1,400 F-35 sorties would be flown approximately 1,690 hours during year 2 in the R-2508 airspace.

NAWCWD China Lake. JSF IOT&E activities proposed for NAWCWD China Lake include test flights. Test flight activities at NAWCWD China Lake would include support aircraft flights and captive carry weapon, air-to-ground weapon release, and air-to-air live missile shot missions. No ground activities except for the launch of targets as part of the air-to-air live missile shot tests would occur at NAWCWD China Lake. These activities would use NAWCWD China Lake's restricted airspace areas R-2505, R-2506, and R-2524 (see Figure 2). Approximately 210 F-35 sorties would be flown approximately 310 hours during year 1 and approximately 540 F-35 sorties would be flown approximately 800 hours during year 2 in the NAWCWD China Lake airspace.

Approximately 50 missions would include releases of both live and inert weapons. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures. Five aerial targets would be launched from NAWCWD China Lake, and a total of five air-to-air live missile shots would occur.

NAWCWD Point Mugu Ranges. JSF IOT&E activities proposed for NAWCWD Point Mugu Ranges include: pilot training and proficiency flights; test flights; and deployment demonstrations. These activities would occur within the Navy's Pacific Range Sea Range located off the coast of Point Mugu (Figure 3). Approximately 220 F-35 sorties would be flown approximately 220 hours during year 1 and approximately 570 F-35 sorties would be flown approximately 540 hours during year 2 in the NAWCWD Point Mugu Ranges airspace. No ground activities would occur at NAWCWD Point Mugu; however, targets would be launched during air-to-air live missile shot weapon missions on the Sea Range. Approximately 22 aerial targets would be launched, and 21 air-to-air live missile shots would occur. All IOT&E test flight activities would occur during daylight and would occur at a minimum of 12 nautical miles offshore.

The NAWCWD Point Mugu Ranges are currently identified as one of the preferred locations for deployment demonstration. Two shipboard deployment demonstrations would occur on the ranges.

NTC Fort Irwin. JSF IOT&E activities proposed for NTC Fort Irwin include test flights. Approximately 40 F-35 sorties would be flown approximately 60 hours during year 1 and approximately 70 F-35 sorties would be flown approximately 100 hours during year 2 in

the NTC Fort Irwin airspace. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for NTC Fort Irwin test flights.

MCAGCC Twentynine Palms. The MCAGCC Twentynine Palms is currently identified as one of the preferred locations for deployment demonstration.

## Federally Listed Species

The R-2508 Complex, including Edwards AFB, NAWCWD China Lake, and NTC Fort Irwin, encompasses portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare counties. Federally listed species potentially occurring in the portions of these counties containing the R-2508 Complex are listed in Table 1.

**Table 1. Federally Listed Animal Species for the R-2508 Complex Area, California (Portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties)**

Scientific Name	Common Name	Federal Status
<b>Invertebrates</b>		
<i>Euproserpinus euterpe</i>	Kern primrose sphinx moth	Threatened
<i>Desmocerus californicus</i>	Elderberry longhorn beetle	Threatened
<b>Fish</b>		
<i>Gila bocolor snyderi</i>	Owens tui chub	Endangered
<i>Gila bicolor mohavensis</i>	Mohave tui chub	Endangered
<i>Cyprinodon radiosus</i>	Owens pupfish	Endangered
<i>Onchorhynchus aquabonita</i>	Little Kern golden trout	Threatened
<i>Onchorhynchus clarki</i>	Lahontan cutthroat trout	Threatened
<b>Reptiles and Amphibians</b>		
<i>Rana aurora draytoni</i>	California red-legged frog	Threatened
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<i>Gambelia silus</i>	Blunt-nosed leopard lizard	Endangered
<b>Birds</b>		
<i>Charadrius alexandrinus</i>	Western snowy plover	Threatened
<i>Haliaeetus leucocephalus</i>	Bald eagle	Protected
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered
<i>Vireo bellii pusillus</i>	Least Bell's vireo	Endangered
<i>Coccyzus americanus</i>	Western yellow-billed	Candidate
<i>Falco peregrinus anatum</i>	Peregrine falcon	Delisted
<i>Aquila chrysaetos</i>	Golden eagle	Protected
<i>Pipilo crissalis eremophila</i>	Inyo California towhee	Threatened
<i>Branta canadensis leucopaeria</i>	Aleutian Canada goose	Delisted
<i>Gymnogyps californianus</i>	California condor	Endangered
<b>Mammals</b>		
<i>Microtus californicus scirpenis</i>	Amaragosa vole	Endangered
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Endangered
<i>Dipodomys ingens</i>	Giant kangaroo rat	Endangered
<i>Dipodomys nitratooides</i>	Tipton kangaroo rat	Endangered
<i>Ovis canadensis sierrae</i>	Sierra Nevada bighorn	Endangered

Sources: State of California, Department of Fish and Game, 2009.

The NAWCWD Point Mugu Ranges (Sea Range) are located off the coast of Los Angeles, Ventura, Santa Barbara, and San Luis Obispo counties. Federally listed species potentially occurring in the Sea Range area are listed in Table 2. A separate letter has also been sent to the NMFS Southwest Regional Office.

**Table 2. Federally Listed Animal Species for the Point Mugu Sea Range Area**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Federal Status</b>
<b><i>Fish</i></b>		
<i>Eucyclogobius newberryi</i>	Tidewater goby	Endangered
<i>Gasterosteus aculeatus williamsoni</i>	Unarmoured three-spined stickleback	Endangered
<i>Oncorhynchus kisutch</i>	Coho salmon	Endangered
<i>Oncorhynchus mykiss</i>	Steelhead trout	Threatened
<b><i>Reptiles and Amphibians</i></b>		
<i>Bufo microscaphus californicus</i>	Arroyo toad	Endangered
<i>Rana aurora draytonii</i>	California red-legged frog	Threatened
<b><i>Birds</i></b>		
<i>Bireo bellii pusillus</i>	Least Bell's vireo	Endangered
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	Threatened
<i>Empidonax trailli extimus</i>	Southwestern willow flycatcher	Endangered
<i>Falco peregrinus anatum</i>	American peregrine falcon	Delisted
<i>Haliaeetus leucocephalus</i>	Bald eagle	Delisted
<i>Pelecanus occidentalis californicus</i>	California brown pelican	Endangered
<i>Sterna antillarum browni</i>	California least tern	Endangered
<b><i>Mammals</i></b>		
<i>Arctocephalus townsendi</i>	Guadalupe fur-seal	Threatened
<i>Balaena glacialis</i>	Right whale	Endangered
<i>Balaenoptera borealis</i>	Sei whale	Endangered
<i>Balaenoptera physalus</i>	Finback whale	Endangered
<i>Balaenoptea musculus</i>	Blue whale	Endangered
<i>Enhydra lutris nereis</i>	Southern sea otter	Threatened
<i>Eumetopias jubatus</i>	Steller (=northern) sea-lion	Threatened
<i>Megaptera novaengliae</i>	Humpback whale	Endangered
<i>Physeter macrocephalus</i>	Sperm whale	Endangered

MCAGCC Twentynine Palms is located in San Bernardino County, CA. Federally listed species for the desert portion of San Bernardino County are listed in Table 3.

**Table 3. Federally Listed Animal Species for San Bernardino  
County (Desert Portion only), CA**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<b><i>Fish</i></b>		
<i>Gila bicolor mohavensis</i>	Mohave tui chub	Endangered
<b><i>Reptiles and Amphibians</i></b>		
<i>Bufo californicus</i>	Arroyo toad	Endangered
<i>Gopherus agassizii</i>	Desert tortoise	Threatened
<b><i>Birds</i></b>		
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Candidate
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Endangered
<i>Gymnogyps californianus</i>	California condor	Endangered
<i>Pelecanus occidentalis</i>	Brown pelican	Endangered
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	Endangered
<i>Vireo bellii pusillus</i>	Least Bell's vireo	Endangered

### **Biological Resource Impacts**

Edwards AFB. Potential impacts to biological resources from JSF IOT&E activities at Edwards AFB could occur primarily from noise generated during takeoff and landing at the Edwards AFB airfield. No significant impacts to biological resources are expected.

Noise contours at the Edwards AFB airfield would increase over baseline conditions due to an increase in F-35 operations under the Proposed Action. Wildlife in the vicinity of the Edwards AFB airfield are expected to be acclimated to routine flight line activities and noise levels. The increase in noise that would occur as a result of the Proposed Action is not considered significant under Federal Aviation Administration (FAA) noise criteria. No significant impacts to wildlife at Edwards AFB are expected to occur.

Land Test Ranges (R-2508 Complex, NAWCWD China Lake, NTC Fort Irwin). Potential impacts to biological resources in the test ranges could occur from F-35 aircraft overflights. Aircraft noise and visual exposure to aircraft present the potential to affect animals in the test range areas. No significant impacts to biological resources are expected.

Noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout test ranges at subsonic and supersonic levels and is recognized as a routine component of military activities. Although range flight activities may have the potential to impact wildlife, many species have shown an ability to acclimate to high noise levels, including sonic booms. This finding is supported by research conducted by the U.S. Air Force on the effects of jet noise from aircraft, including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft-related noise exposure and

do not exhibit significant adverse effects related to their hearing, behavior, or heart rate. Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout ranges where aircraft operations occur. Therefore, impacts from range flight operations are considered less than significant.

F-35 aircraft flying activities would adhere to all existing range restrictions including minimum heights AGL, aircraft overflight restricted areas, supersonic flight areas, and temporal restrictions. Therefore JSF IOT&E activities would not present a new impact to wildlife, but would be consistent with the existing environment for these potential impacts to wildlife on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Therefore, overall range activity would not be expected to change significantly under the Proposed Action. Overflight noise from the F-35 is not expected to be louder than other military jets. No significant impacts to wildlife from the Proposed Action would be expected.

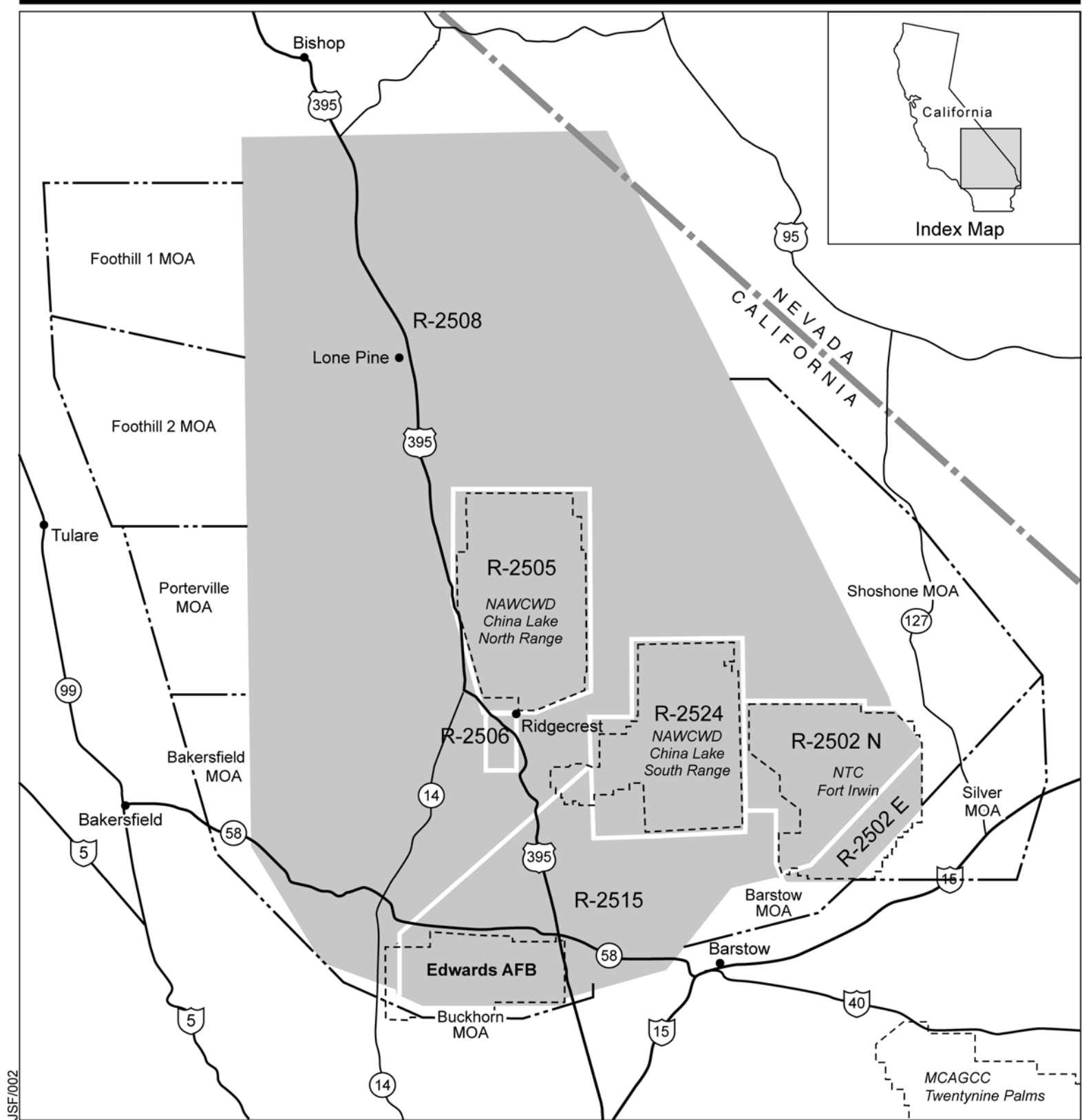
Under JSF IOT&E, a total of 53 air-to-ground releases and 5 aerial target launches and air-to-air live missile shots would be conducted at NAWCWD China Lake. These activities would use the existing targets and test sites. The minimal weapons missions that would occur at NAWCWD China Lake as part of JSF IOT&E would not be expected to result in significant environmental impacts to biological resources.

Sea Test Range (NAWCWD Point Mugu Ranges). JSF IOT&E activities proposed for the Point Mugu Ranges include F-35 overflights and two ship-based deployment demonstrations. Airborne noise in the Sea Range is created by subsonic and supersonic flight activity of aircraft, aerial targets, and missiles. Same as for the overland test ranges, noise sources associated with the Proposed Action would be consistent with these existing noise sources. Existing activities on the Point Mugu ranges were analyzed in the Environmental Impact Statement (EIS)/Overseas EIS Pt Mugu Sea Range. This document concluded that impacts to biological resources from range activity, including those from aircraft, missile, and target overflight, ship operations, and debris from weapons missions, would not be significant.

JSF IOT&E activities proposed for the Pont Mugu Ranges also include a total of 22 aerial target launches and air-to-air live missile shots. Current air-to-air operations on the Sea Range involve high-altitude aircraft operations, launch of targets from NAWCWD Point Mugu, target debris falling into the ocean, occasional intact missiles or targets impacting the ocean, and possibly target recovery using a helicopter. These activities were analyzed in the EIS/OEIS Pt Mugu Sea Range. The EIS/OEIS findings are that impacts of these activities on biological resources in the Sea Range are less than significant. No significant impacts to wildlife from the Proposed Action would be expected.

MCAGCC Twentynine Palms. Based on the limited scope and short duration of the proposed deployment demonstration activities, no significant impacts are expected and only a minimal discussion and analysis are provided for these locations in the EA/OEA.

Potential impacts from deployment demonstrations to biological resources could result from noise produced by F-35 aircraft takeoffs and landings. The Proposed Action would result in a temporary increase in noise levels at the airfields at each deployment demonstration location. However, the increased loudness of noise events is expected to be barely perceptible. No significant impacts to wildlife from the Proposed Action would be expected at the deployment demonstration locations.



## EXPLANATION

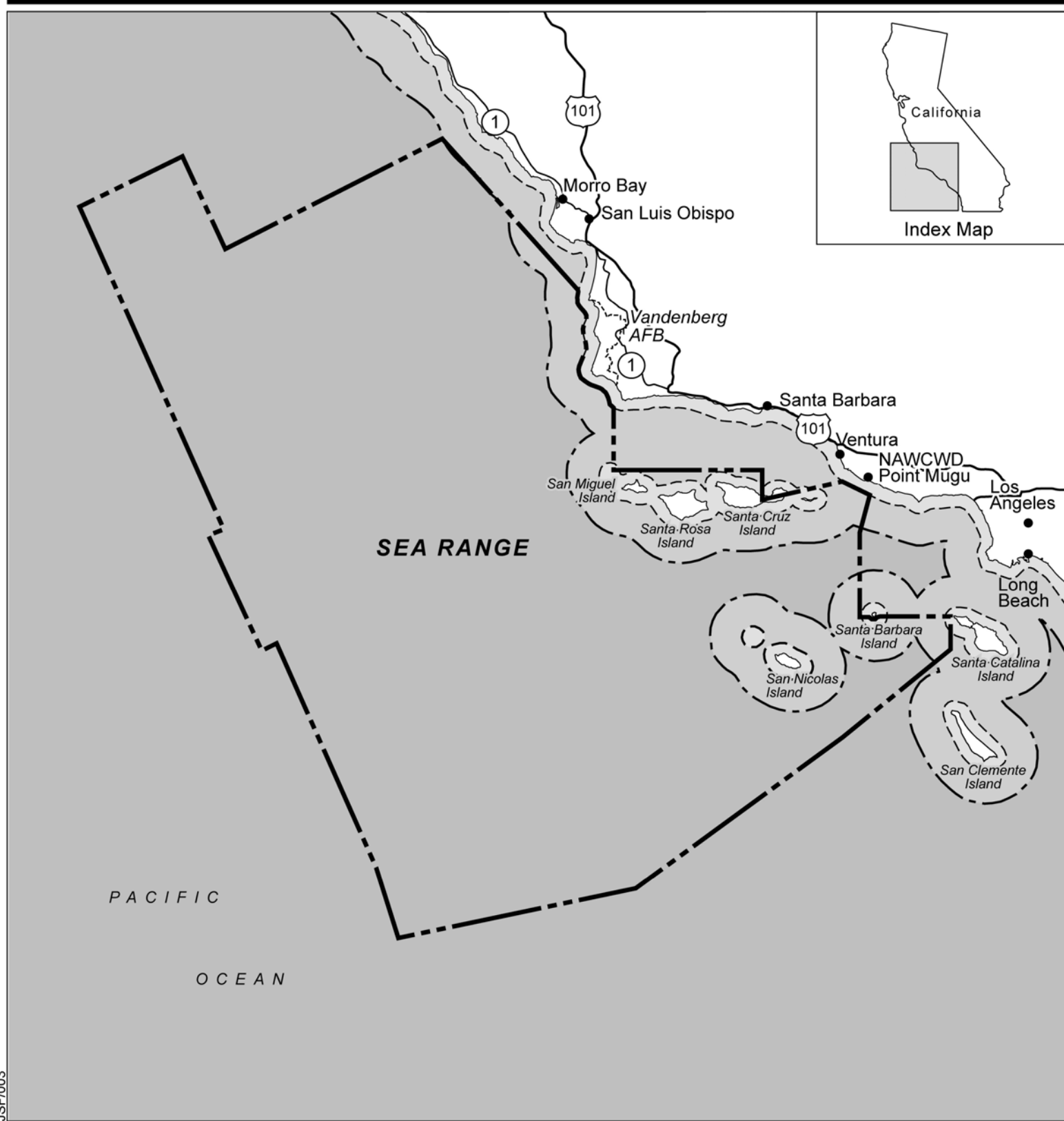
- |  |                       |  |                              |
|--|-----------------------|--|------------------------------|
|  | State Boundary        |  | MOA Military Operations Area |
|  | Restricted Airspace   |  | MOA Boundary                 |
|  | Military Installation |  |                              |
|  | U.S. Highway          |  |                              |
|  | Interstate Highway    |  |                              |
|  | State Highway         |  |                              |

## Edwards AFB, Nearby Test Ranges, and Associated Airspace, California



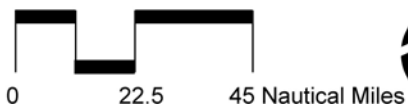


JSF/003



## EXPLANATION

-  Sea Range
-  U.S. Territorial Waters (12nm)
-  State Waters (3nm)
-  Military Installation
-  U.S. Highway
-  State Highway



## NAWCWD, Point Mugu and Sea Range, California

**Figure 3**



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Ventura Fish and Wildlife Office  
2493 Portola Road, Suite B  
Ventura, California 93003



IN REPLY REFER TO:  
2009-SL-0367

July 13, 2009

Charles J. Brown, P.E., YF-02, DAF  
Air Force Center for Engineering and the Environment  
HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, Texas 78235

Subject: Species List and Identification of Potential Adverse Effects to Listed Species

Dear Mr. Brown:

This letter is in response to your request of June 17, 2009 for confirmation of lists of endangered, threatened, candidate, and proposed species included in your attachment. Additionally, the Department of the Air Force requested identification of any adverse effects to listed species or critical habitat.

The Department of the Air Force (Air Force) proposes to base 20 F-35 aircraft out of Edwards Air Force Base and conduct training and proficiency flights, air-to-ground weapons releases and air-to-air live missile shots, and deployment demonstrations at several locations. These activities would be located within the R-2508 Complex, Edwards Air Force Base, Naval Air Warfare Center Weapons Division China Lake, Naval Air Warfare Center Weapons Division Point Mugu, National Training Center at Fort Irwin, and the Marine Corps Air Ground Combat Center at Twentynine Palms.

Based on a phone conversation between you and Erin Shapiro of the Ventura Fish and Wildlife Office on July 8, 2009, we understand that the Air Force has initiated consultation with the National Oceanic and Atmospheric Administration. Therefore, our comments on listed species within the Point Mugu Sea Range are limited to the southern sea otter (*Enhydra lutris nereis*).

The proposed action will not involve any ground-disturbing activities. Your environmental assessment identifies increased noise levels and visual exposure to aircraft as the potential impacts to listed, proposed, and candidate species. Based on our knowledge of the species that are likely to occur in the action area and the nature of the proposed action, we concur that disturbance associated with noise and visual exposure would be the only potential adverse effects.

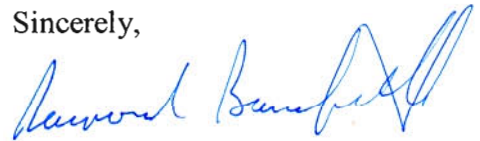
The enclosed lists of species fulfill the requirements of the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act of 1973, as amended (Act). The Air Force, as the lead Federal agency for the project, has the responsibility to review its proposed activities and

determine whether any listed species may be affected. If the project is a construction project that may require an environmental impact statement, the Air Force has the responsibility to prepare a biological assessment to make a determination of the effects of the action on the listed species or critical habitat. If the Air Force determines that a listed species or critical habitat is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to threatened or endangered species or their critical habitat prior to a written request for formal consultation. During this review process, the Air Force may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

In the enclosed lists, we have omitted species from the lists you provided us that do not occur in the area under consideration, are no longer listed, or not the responsibility of the Fish and Wildlife Service. We have included species that are likely to be present that were not on the lists you provided.

Should you have any questions, please contact Erin Shapiro of the Ventura Fish and Wildlife Office at (805) 644-1766, extension 369.

Sincerely,



Raymond Bransfield  
Senior Biologist

Enclosures

## SPECIES LIST FOR THE POINT MUGU SEA RANGE

### **Bird**

Brown pelican	<i>Pelecanus occidentalis</i>	E
California least tern	<i>Sterna antillarum browni</i>	E
Least Bell's vireo	<i>Vireo bellii pusillus</i>	E
Light-footed clapper rail	<i>Rallus longirostris levipes</i>	E
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E, CH
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	T, CH
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C
Marbled murrelet	<i>Brachyramphus marmoratus</i>	T
Xantus's murrelet	<i>Synthliboramphus hypoleucus</i>	C

### **Fish**

Tidewater goby	<i>Eucyclogobius newberryi</i>	E, CH
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### **Mammal**

Southern sea otter	<i>Enhydra lutris nereis</i>	T
Island foxes	<i>Urocyon littoralis</i>	E

### **Reptile**

Island night lizard	<i>Xantusia riversiana</i>	T
---------------------	----------------------------	---

## SPECIES LIST FOR THE R-2508 COMPLEX

### **Amphibian**

Arroyo toad	<i>Bufo californicus</i>	E
Mountain yellow-legged frog	<i>Rana muscosa</i>	C
Yosemite toad	<i>Bufo canorus</i>	C
California red-legged frog	<i>Rana aurora draytonii</i>	T, CH
Sierra Nevada yellow-legged frog	<i>Rana sierrea</i>	C

### **Bird**

Least Bell's vireo	<i>Vireo bellii pusillus</i>	E
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E, CH
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C
Inyo California towhee	<i>Pipilo crissalis eremophilus</i>	T, CH
California condor	<i>Gymnogyps californianus</i>	E, CH

### **Fish**

Mohave tui chub	<i>Gila bicolor mohavensis</i>	E
Lahontan cutthroat trout	<i>Oncorhynchus clarki henshawi</i>	T
Paiute cutthroat trout	<i>Oncorhynchus clarki seleniris</i>	T
Owen's pupfish	<i>Cyprinodon radiosus</i>	E
Owen's tui chub	<i>Gila bicolor synderi</i>	E

### **Reptile**

Desert tortoise	<i>Gopherus agassizii</i>	T, CH
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### **Mammal**

Fisher	<i>Martes pennanti</i>	C
Sierra Nevada bighorn sheep	<i>Ovis canadensis californiana</i>	E, CH

LISTED AND PROPOSED SPECIES  
WHICH MAY OCCUR IN THE VENTURA FISH AND WILDLIFE OFFICE'S  
AREA OF RESPONSIBILITY IN  
SAN BERNARDINO COUNTY, CALIFORNIA

**Bird**

*Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	E
Least Bell's vireo	<i>Vireo bellii pusillus</i>	E
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E, CH
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C
California condor	<i>Gymnogyps californianus</i>	E

**Reptile**

Desert tortoise	<i>Gopherus agassizii</i>	T, CH
-----------------	---------------------------	-------

**Amphibian**

Arroyo toad	<i>Bufo californicus</i>	E
-------------	--------------------------	---

**Fish**

Mohave tui chub	<i>Gila bicolor mohavensis</i>	E
*Bonytail chub	<i>Gila elegans</i>	E, CH
*Razorback sucker	<i>Xyrauchen texanus</i>	E, CH

\* These species occur in San Bernardino County along the Colorado River. Questions concerning these species should be referred to the U.S. Fish and Wildlife Service at 2321 W. Royal Palms Road, Suite 103, Phoenix, Arizona 85021-4951 (Phone 602 242-0210).

**Key:**

E - Endangered

T - Threatened

CH - Critical habitat

C - Candidate species for which the Fish and Wildlife Service has on file sufficient information on the biological vulnerability and threats to support proposals to list as endangered or threatened.





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

**MEMORANDUM FOR**

James Garrison  
State Historic Preservation Officer  
Arizona State Parks  
1300 W. Washington Street  
Phoenix, AZ 85007

**FROM:** HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

**SUBJECT:** F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

**REFERENCE:** National Historic Preservation Act of 1966, Section 106 (16 U.S.C. Section 470f) and Section 110 (16 U.S.C. Section 470h-2)

Dear Mr. Garrison:

We respectfully request the initiation of consultation under Sections 106 and 110 as the U.S. Department of the Air Force is early in the preparation process of an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E). A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

The JSF program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and IOT&E phases. This EA/OEA addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities, which would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on the attached Figure 1.



1) Basing the F-35 aircraft:

Edwards Air Force Base (AFB), California

2) Test Range Activities (airspace only)

Training and Proficiency Flights:

R-2508 Complex (Edwards AFB airspace)

Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges, California

Nevada Test and Training Range (NTTR), Nevada

Flight Testing:

R2508 Complex (Edwards AFB airspace)

Marine Corps Air Station (MCAS), Yuma Ranges, Arizona

National Training Center (NTC), Fort Irwin, California

NAWCWD, China Lake, California

NAWCWD, Point Mugu Ranges, California

NTTR, Nevada

Utah Test and Training Range (UTTR), Utah

White Sands Missile Range (WSMR), New Mexico

3) Deployment Demonstrations:

Alpena Combat Readiness Training Center (CRTC), Michigan

Edwards AFB

Eglin AFB, FL

Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California

MCAS Yuma, Arizona

NAS Lemoore, California

Carriers on the NAWCWD Point Mugu Ranges

Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or takeoff at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

Missions involving weapons would be conducted during some test flights. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile

shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

The area of potential effects (APE) for the proposed action in Arizona is MCAS Yuma and its associated ranges (Figure 2). The MCAS Yuma Ranges include the western portion of the Barry Goldwater Range and the Kofa Range in Arizona and the Chocolate Mountain Range in California. JSF IOT&E activities proposed for MCAS Yuma Ranges include test flights and a possible deployment demonstration. A maximum of approximately 330 F-35 sorties would be flown a maximum of approximately 480 hours during year 1 and a maximum of approximately 530 F-35 sorties would be flown a maximum of approximately 780 hours during year 2. This is a maximum activity for all three MCAS Yuma Ranges combined; a breakdown of activity by the three ranges has not yet been developed. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for MCAS Yuma test flights. In addition, MCAS Yuma is currently identified as one of the preferred locations for deployment demonstration. During test flight activities, F-35 aircraft would not land or take off at MCAS Yuma runways, except in an emergency situation. However, during the deployment demonstration activity F-35 aircraft would use the runway.

JSF IOT&E activities would not include any construction or other ground-disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures would occur. F-35 aircraft flying activities would adhere to all existing range restrictions and would be consistent with the existing

environment on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges, and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Overall range activity would not be expected to change significantly under the Proposed Action. Therefore, the Proposed Action would not result in a significant change to conditions that would affect Native American or other traditional cultural resources. For these reasons, significant impacts to cultural resources are not expected.

The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

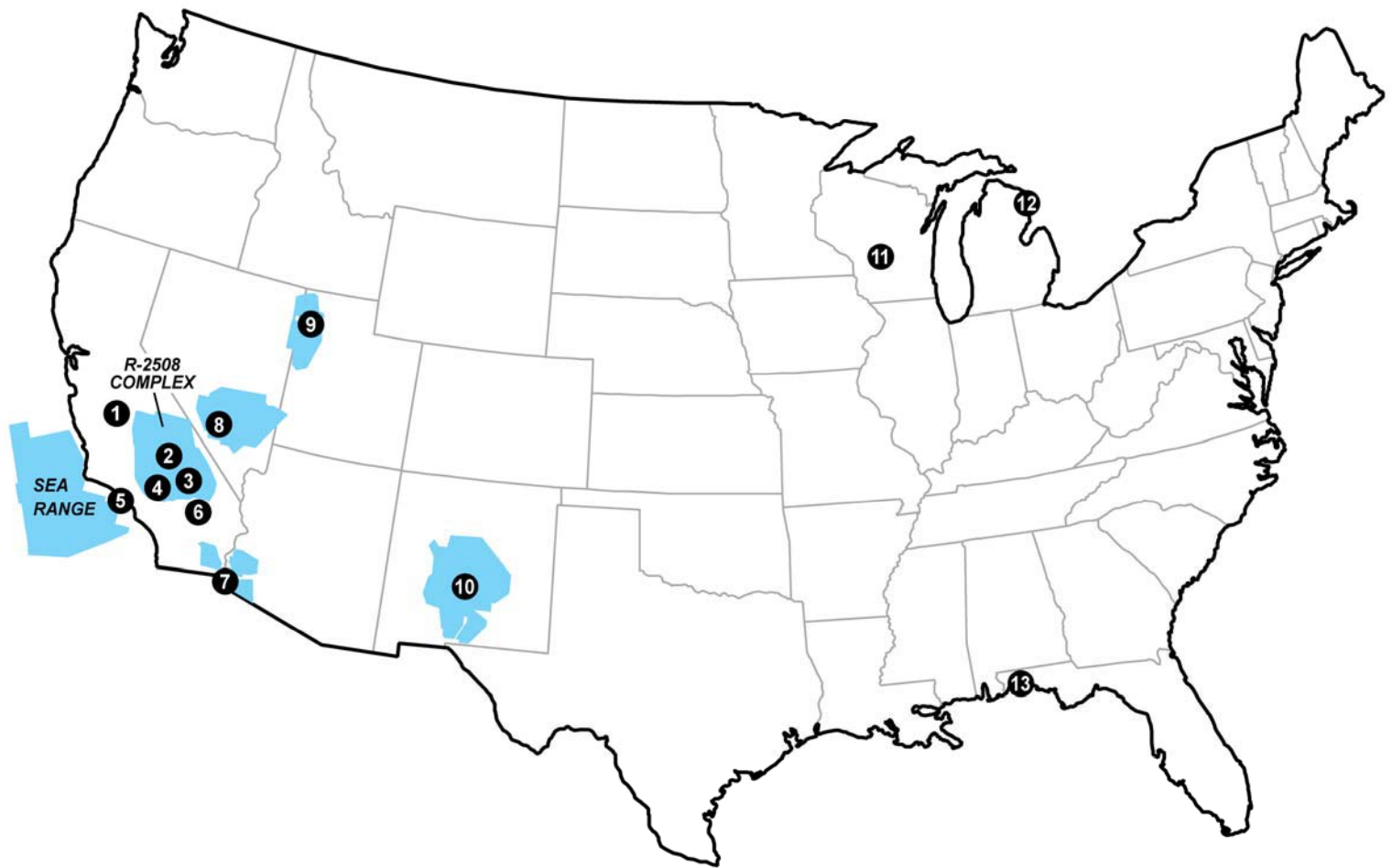
Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'CJB', followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments: Figure 1  
Figure 2



## EXPLANATION

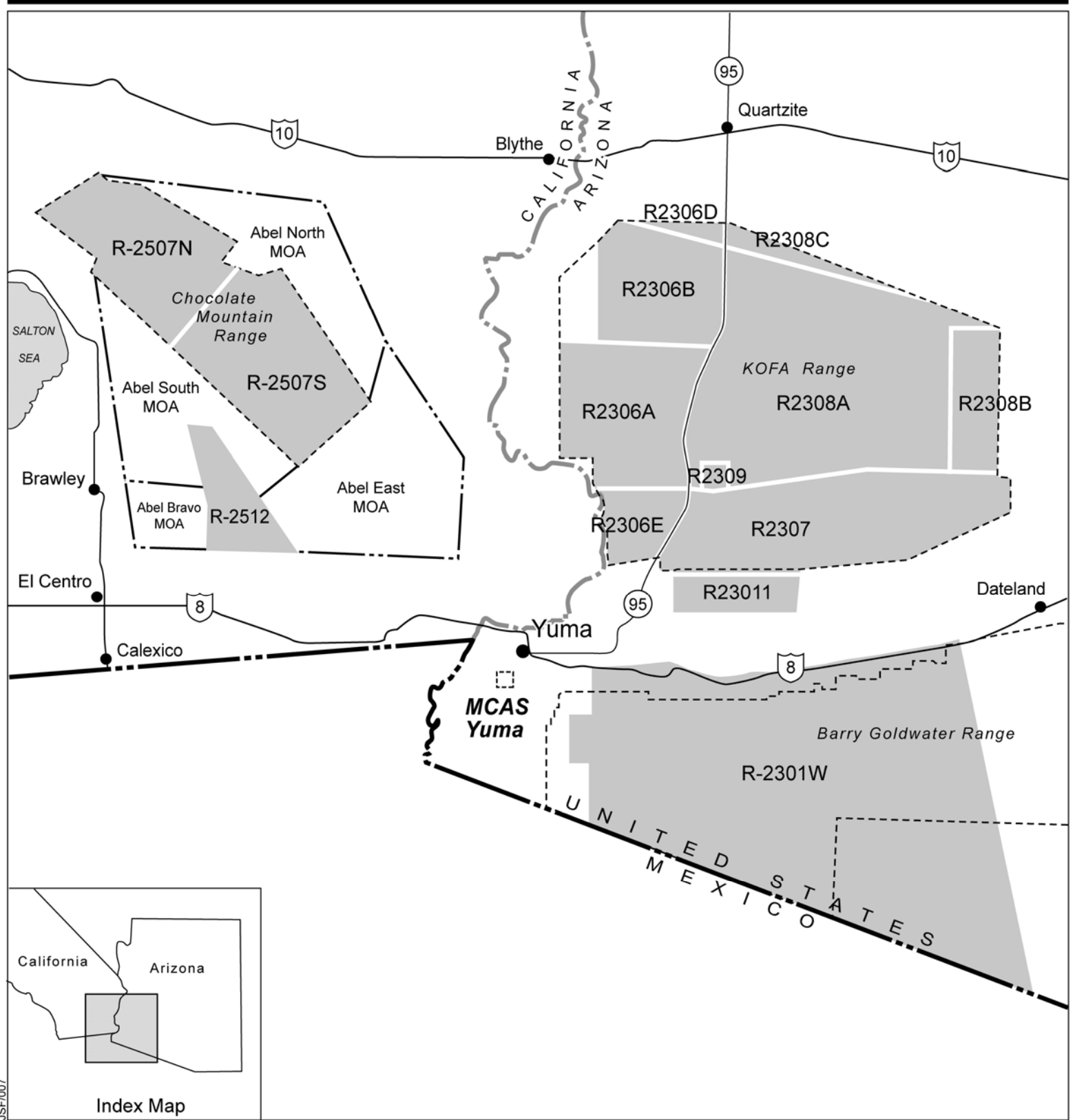
- 1 Naval Air Station, Lemoore, CA
- 2 Naval Air Warfare Center Weapons Division China Lake, CA
- 3 National Training Center, Fort Irwin, CA
- 4 Edwards Air Force Base, CA
- 5 Naval Air Warfare Center Weapons Division Point Mugu, CA
- 6 Marine Corps Air Ground Combat Center Twentynine Palms, CA
- 7 Marine Corps Air Station, Yuma, AZ

- 8 Nevada Test and Training Range, NV
- 9 Utah Test and Training Range, UT
- 10 White Sands Missile Range, NM
- 11 Volk Field Air National Guard Base, WI
- 12 Alpena Combat Readiness Training Center, MI
- 13 Eglin Air Force Base, FL

Test Range

## Joint Strike Fighter IOT&E Locations





## EXPLANATION

- |  |                       |  |                              |
|--|-----------------------|--|------------------------------|
|  | State Boundary        |  | MOA Military Operations Area |
|  | U.S. Border           |  | MOA Boundary                 |
|  | Restricted Airspace   |  |                              |
|  | Military Installation |  |                              |
|  | Interstate Highway    |  |                              |
|  | State Highway         |  |                              |

## Marine Corps Air Station, Yuma, and Ranges, Arizona and California



**Figure 2**



SHPO-2009-0091(40260)  
NHPA

**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR

James Garrison  
State Historic Preservation Officer  
Arizona State Parks  
1300 W. Washington Street  
Phoenix, AZ 85007



FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

REFERENCE: National Historic Preservation Act of 1966, Section 106 (16 U.S.C. Section 470f) and Section 110 (16 U.S.C. Section 470h-2)

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The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

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Sincerely,



CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments: Figure 1  
Figure 2

✱

No Historic Properties Affected

*Ann W. Howard* 7-13-09  
for Arizona State Historic Preservation Office  
Arizona State Parks Board

\*Contingent upon no tribal concerns.







**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

**MEMORANDUM FOR**

Milford Wayne Donaldson, FAIA  
Office of Historic Preservation  
California Department of Parks and Recreation  
1416 9th Street, Room 1442-7  
Sacramento, CA 95814  
P.O. Box 942896  
Sacramento, CA 94296-0001

**FROM:** HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

**SUBJECT:** F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

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NAWCWD, Point Mugu Ranges, California

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Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or takeoff at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

Missions involving weapons would be conducted during some test flights. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile

shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

The area of potential effects (APE) for the proposed action in California includes: Edwards AFB, R-2508 Complex, NAWCWD China Lake, NAWCWD Point Mugu, NTC Fort Irwin, Chocolate Mountain Range portion of the MCAS Yuma Ranges, MCAGCC Twentynine Palms, and NAS Lemoore (Figures 1 through 4). Activities proposed for these locations are described below.

Edwards AFB. During IOT&E, 16 F-35 aircraft would be staged at Edwards AFB during year 1 and 20 F-35 aircraft during year 2. Existing dedicated JSF facilities and base facilities that support other ongoing flight testing and maintenance activities at Edwards AFB would be used. No new facilities or modifications to existing facilities would be required for IOT&E activities. Ground based tests at Edwards AFB would include static operation of the F-35 aircraft engine either on the airfield, on a test stand, or in an enclosed building (hush house). All F-35 IOT&E test range flights would originate and terminate at Edwards AFB. Approximately 1,550 sorties during year 1 and 3,520 sorties during year 2 would originate and terminate at Edwards AFB.

In addition, Edwards AFB is currently identified as one of the preferred locations for deployment demonstration.

R-2508 Complex. The R-2508 Complex includes the R-2508 and R-2515 restricted airspace areas that are associated with Edwards AFB plus adjacent military operations areas (MOAs) (see Figure 2). These areas would be used for test range activities including both pilot training and proficiency flights and test flights. No weapons missions are proposed for R-2508 Complex test flights. Approximately 540 F-35 sorties would be flown approximately 860 hours during year 1 and approximately 1,400 F-35 sorties would be flown approximately 1,690 hours during year 2 in the R-2508 airspace.

NAWCWD China Lake. JSF IOT&E activities proposed for NAWCWD China Lake include test flights. Test flight activities at NAWCWD China Lake would include support aircraft flights and captive carry weapon, air-to-ground weapon release, and air-to-air live missile shot missions. No ground activities except for the launch of targets as part of the air-to-air live missile shot tests would occur at NAWCWD China Lake. These activities would use NAWCWD China Lake's restricted airspace areas R-2505, R-2506, and R-2524 (see Figure 2). Approximately 210 F-35 sorties would be flown approximately 310 hours during year 1 and approximately 540 F-35 sorties would be flown approximately 800 hours during year 2 in the NAWCWD China Lake airspace.

Approximately 50 missions would include releases of both live and inert weapons. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures. Five aerial targets would be launched from NAWCWD China Lake, and a total of five air-to-air live missile shots would occur.

NAWCWD Point Mugu Ranges. JSF IOT&E activities proposed for NAWCWD Point Mugu Ranges include pilot training and proficiency flights, test flights, and deployment demonstrations. These activities would occur within the Navy's Pacific Range Sea Range located off the coast of Point Mugu (Figure 3). Approximately 220 F-35 sorties would be flown approximately 220 hours during year 1 and approximately 570 F-35 sorties would be flown approximately 540 hours during year 2 in the NAWCWD Point Mugu Ranges airspace. No ground activities would occur at NAWCWD Point Mugu; however, targets would be launched during air-to-air live missile shot weapon missions on the Sea Range. Approximately 22 aerial targets would be launched, and 21 air-to-air live missile shots would occur. All IOT&E test flight activities would occur during daylight and would occur at a minimum of 12 nautical miles offshore.

The NAWCWD Point Mugu Ranges are currently identified as one of the preferred locations for deployment demonstration. Two shipboard deployment demonstrations would occur on the ranges.

NTC Fort Irwin. JSF IOT&E activities proposed for NTC Fort Irwin include test flights. Approximately 40 F-35 sorties would be flown approximately 60 hours during year 1 and approximately 70 F-35 sorties would be flown approximately 100 hours during year 2 in the NTC Fort Irwin airspace. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for NTC Fort Irwin test flights.

Chocolate Mountains Range. The Chocolate Mountain Range is one of three ranges associated with MCAS Yuma. The other two are the western portion of the Barry Goldwater Range and the Kofa Range in Arizona. JSF IOT&E activities proposed for MCAS Yuma Ranges include test flights. A maximum of approximately 330 F-35 sorties would be flown a maximum of approximately 480 hours during year 1 and a maximum of approximately 530 F-35 sorties would be flown a maximum of approximately 780 hours during year 2. This is a maximum activity for all three MCAS Yuma Ranges combined; a breakdown of activity by the three ranges has not yet been developed. No use of other aircraft has been identified as being required to support F-35 test flights in this area. No weapons missions are proposed for MCAS Yuma Range test flights.

MCAGCC Twentynine Palms. The MCAGCC Twentynine Palms is currently identified as one of the preferred locations for deployment demonstration.

NAS Lemoore. NAS Lemoore is currently identified as one of the preferred locations for deployment demonstration.

JSF IOT&E activities would not include any construction or other ground-disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures would occur. F-35 aircraft flying activities would adhere to all existing range restrictions and would be consistent with the existing environment on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges, and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Overall range activity would not be expected to change significantly under the Proposed Action. Therefore, the Proposed Action would not result in a significant change to conditions that would affect Native American or other traditional cultural resources. For these reasons, significant impacts to cultural resources are not expected.

The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

Please contact me at (210) 536-4203 if you have any questions.

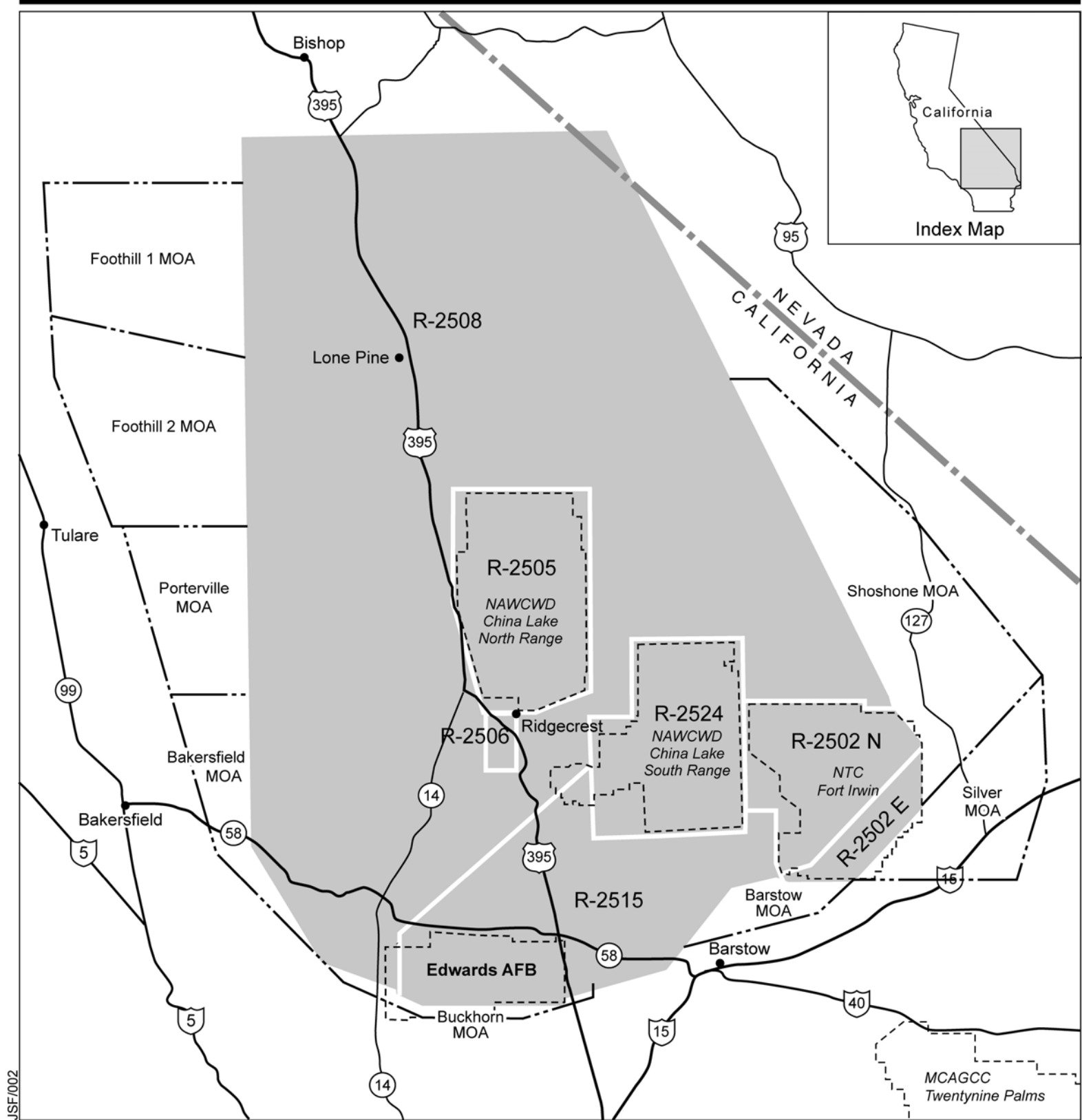
Sincerely,

A handwritten signature in black ink, appearing to read 'CJB', followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments: Figure 1  
Figure 2  
Figure 3  
Figure 4



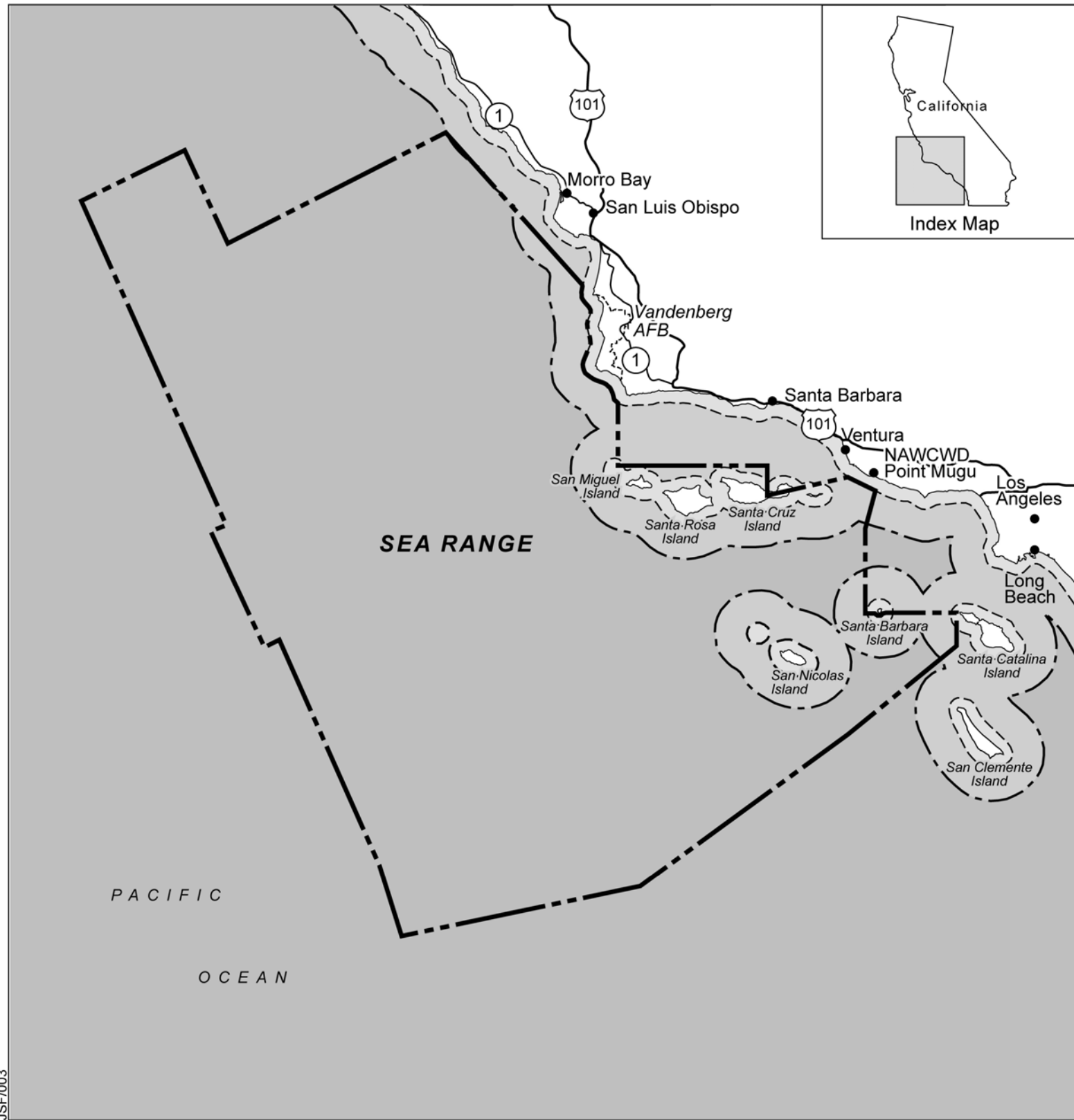


## EXPLANATION

- |  |                       |  |                              |
|--|-----------------------|--|------------------------------|
|  | State Boundary        |  | MOA Military Operations Area |
|  | Restricted Airspace   |  | MOA Boundary                 |
|  | Military Installation |  |                              |
|  | U.S. Highway          |  |                              |
|  | Interstate Highway    |  |                              |
|  | State Highway         |  |                              |

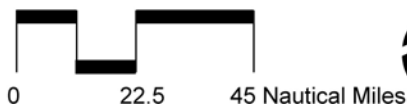
## Edwards AFB, Nearby Test Ranges, and Associated Airspace, California





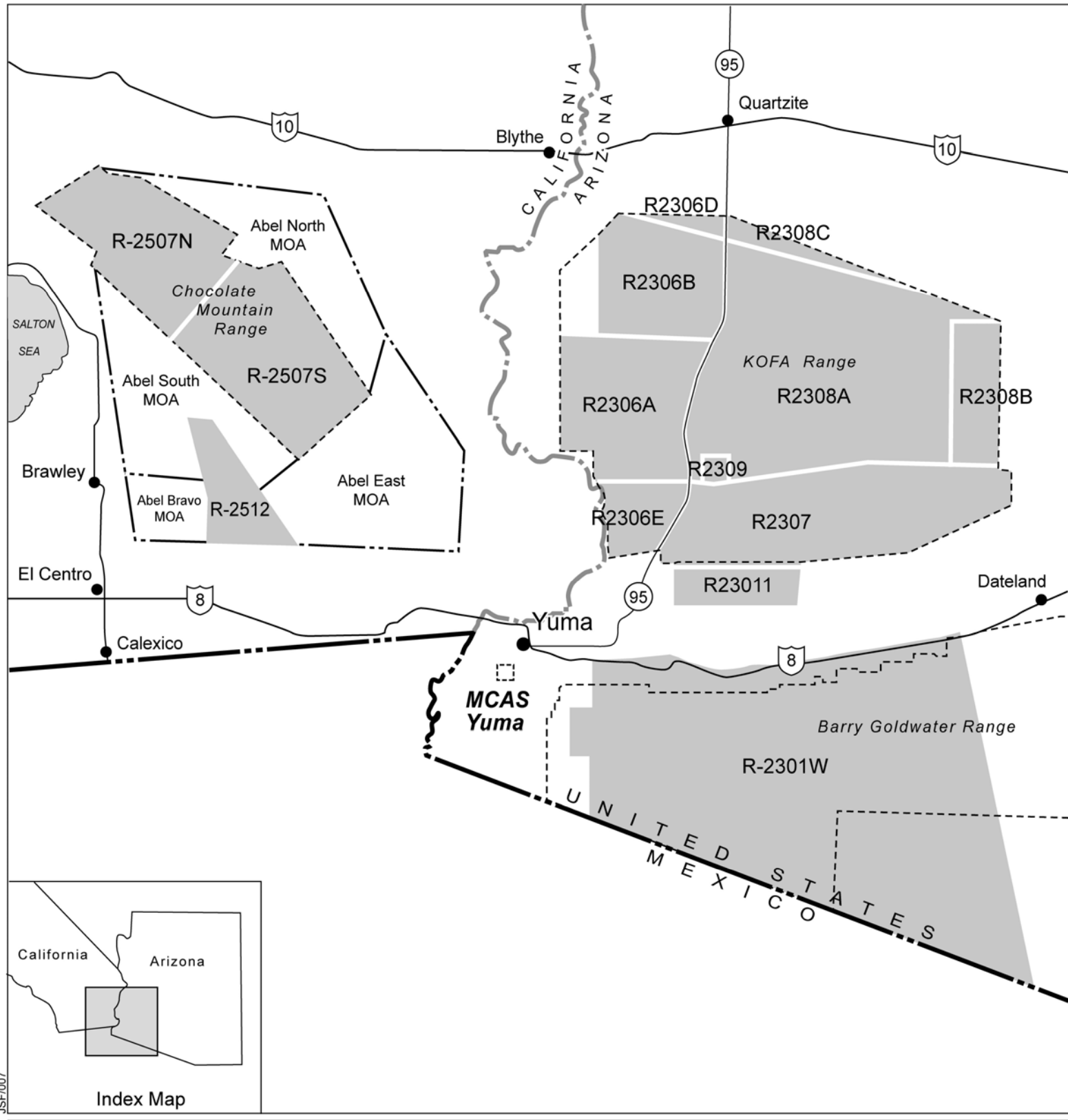
## EXPLANATION

- Sea Range
- U.S. Territorial Waters (12nm)
- State Waters (3nm)
- Military Installation
- 101 U.S. Highway
- 1 State Highway



## NAWCWD, Point Mugu and Sea Range, California

Figure 3



**EXPLANATION**

- · — · — State Boundary
- · — · — U.S. Border
- Restricted Airspace
- Military Installation
- 8 Interstate Highway
- 86 State Highway
- MOA Military Operations Area
- MOA Boundary

**Marine Corps Air Station  
Yuma, and Ranges,  
Arizona and California**



**Figure 4**

**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896  
SACRAMENTO, CA 94296-0001  
(916) 653-6624 Fax: (916) 653-9824  
calshpo@ohp.parks.ca.gov  
www.ohp.parks.ca.gov



August 24, 2009

In reply refer to: USAF090618A

Mr. Charles Brown  
Program Manager  
United States Department of the Air Force  
AFCEE/EX  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

Re: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

Dear Mr. Brown:

Thank you for your letter dated 17 June 2009 requesting my review and comment with regard to the referenced undertaking. You are consulting with me, in order to comply with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), as amended, and its implementing regulation at 36 CFR 800. In support of your consultation letter, you submitted a clarification memorandum with attachments showing the locations for the test and evaluation operations planned at several bases in California.

The undertaking, as I understand it, includes IOT&E activities for the F-35 JSF. Your letter provides a list of activities involved in the testing and evaluation. Those activities taking place in California are:

- Basing the F-35 aircraft
  - Edwards Air Force Base (AFB)
- Test Range Activities
  - Training and proficiency flights
    - R-2508 Complex at Edwards AFB
    - Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges
  - Flight Testing
    - R-2508 Complex at Edwards AFB
    - National Training Center (NTC), Fort Irwin
    - NAWCWD, China Lake
    - NAWCWD, Point Mugu Ranges
- Deployment Demonstrations
  - Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms
  - Naval Air Station (NAS) Lemoore
  - Carriers on the NAWCWD Point Mugu Ranges

The JSF IOT&E activities will not include any construction or other ground disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures will occur. F-35 aircraft flying activities will adhere to all existing range restrictions and would be consistent with the existing environment on the test ranges, where similar aircraft have operated for a number of years. Overall range activity is not expected to change significantly under this proposed action.

Although the information provided with your letter does not specifically identify the Area of Potential Effect (APE) for this project, the attached maps identify the ranges for flight testing and training flights. Your letter does not indicate the specific area within Edwards AFB that will be used for basing the

aircraft; nor does it identify any historic properties that exist within the APE. The U.S. Air Force has applied the Criteria of Adverse Effect (36 CFR § 800. 5(a)(1)) and has concluded that the undertaking would have no adverse effect on historic properties.

Despite the shortcomings regarding the delineation of the APE and identification and evaluation of historic properties, you clearly state that no new construction or modifications to existing buildings will be necessary and that flight training, testing, and evaluation will occur on ranges currently used for similar flight activities. Therefore, in accordance with 36 CFR 800.5(b), I can concur with a finding of No Adverse Effect for this undertaking. In future submissions for Section 106 compliance, please remember to define the APE and identify and evaluate historic properties within that area.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact Mark A. Beason, Project Review Unit historian, at (916) 653-8902 or [mbeason@parks.ca.gov](mailto:mbeason@parks.ca.gov).

Sincerely,

A handwritten signature in cursive script, reading "Susan K Stratton for".

Milford Wayne Donaldson, FAIA  
State Historic Preservation Officer



**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR

Barbara Mattick  
Historic Preservation Office  
500 S. Bronough Street  
Tallahassee, FL 32399-0250

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

REFERENCE: National Historic Preservation Act of 1966, Section 106 (16 U.S.C. Section 470f) and Section 110 (16 U.S.C. Section 470h-2)

Dear Ms Mattick:

We respectfully request the initiation of consultation under Sections 106 and 110 as the U.S. Department of the Air Force is early in the preparation process of an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E). A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

The JSF program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and IOT&E phases. This EA/OEA addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities, which would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on the attached Figure 1.

1) Basing the F-35 aircraft:

Edwards Air Force Base (AFB), California

## 2) Test Range Activities (airspace only)

### Training and Proficiency Flights:

R-2508 Complex (Edwards AFB airspace)

Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges, California

Nevada Test and Training Range (NTTR), Nevada

### Flight Testing:

R2508 Complex (Edwards AFB airspace)

Marine Corps Air Station (MCAS), Yuma Ranges, Arizona

National Training Center (NTC), Fort Irwin, California

NAWCWD, China Lake, California

NAWCWD, Point Mugu Ranges, California

NTTR, Nevada

Utah Test and Training Range (UTTR), Utah

White Sands Missile Range (WSMR), New Mexico

## 3) Deployment Demonstrations:

Alpena Combat Readiness Training Center (CRTC), Michigan

Edwards AFB

Eglin AFB, FL

Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California

MCAS Yuma, Arizona

NAS Lemoore, California

Carriers on the NAWCWD Point Mugu Ranges

Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

### *Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing

the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB.

### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or takeoff at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

Missions involving weapons would be conducted during some test flights. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.



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Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

The area of potential effects (APE) for the proposed action in Florida is Eglin AFB. Eglin AFB is a proposed location for a deployment demonstration during Block 2. The activity proposed for Eglin AFB is different from the other deployment demonstrations which would originate and terminate at Edwards AFB. At Eglin AFB, F-35 aircraft already based there would be flown between the Eglin Main Base airfield and Duke Field for three days of field carrier landing practice. The aircraft would then be flown to Edwards AFB for the remainder of the IOT&E program.

JSF IOT&E activities would not include any construction or other ground-disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures would occur. F-35 aircraft flying activities would adhere to all existing range restrictions and would be consistent with the existing environment on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges, and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Overall range activity would not be expected to change significantly under the Proposed Action. Therefore, the Proposed Action would not result in a significant change to conditions that would affect Native American or other traditional cultural resources. For these reasons, significant impacts to cultural resources are not expected.

The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'CJB', followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachment: Figure 1



FLORIDA DEPARTMENT OF STATE

**Kurt S. Browning**

Secretary of State

DIVISION OF HISTORICAL RESOURCES

Mr. Charles J. Brown  
Department of the Air Force  
HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, Texas 78235-5112

June 17, 2009

RE: DHR Project File Number: 2009-3431  
*F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)*  
Eglin Air Force Base, Okaloosa County

Dear Mr. Brown:

This office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*.

Based on the information provided, it is the opinion of this office that the above-referenced undertaking will have no effect on historic properties.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail [sedwards@dos.state.fl.us](mailto:sedwards@dos.state.fl.us), or at 850-245-6333 or 800-847-7278.

Sincerely,

Laura A. Kammerer  
Deputy State Historic Preservation Officer  
For Review and Compliance



**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR

Brian D. Conway  
State Historic Preservation Officer  
Michigan Historical Center  
Department of History, Arts and Libraries  
P.O. Box 30740  
702 W. Kalamazoo St.  
Lansing, MI 48909-8240

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

REFERENCE: National Historic Preservation Act of 1966, Section 106 (16 U.S.C. Section 470f) and Section 110 (16 U.S.C. Section 470h-2)

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shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

#### *Deployment Demonstration Activities.*

Deployment demonstrations consist of temporary deployments of the F-35 aircraft and personnel from Edwards AFB to operate from other locations. Deployments are planned for 4 to 15 days with 2 to 6 F-35 aircraft. For purposes of analysis, a typical deployment demonstration consists of a maximum of 1 C-17 and 6 JSF aircraft and approximately 170 persons deploying for up to 15 days. The JSF would fly up to approximately 100 sorties (270 hours).

Deployment demonstration flights would generally occur in the military airspace in the vicinity of the deployment location, but could use whatever ranges are available and/or needed for the specific missions of each demonstration. Deployment demonstration flight activities would generally be similar to those activities that would occur at the test range locations, but would be of a limited duration. Most flight time would be logged above 20,000 feet above mean sea level. Approximately 20 percent of the deployment demonstration sorties would be flown during night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

The area of potential effects (APE) for the proposed action in Michigan is the Alpena CRTC. Alpena CRTC is a proposed location for two deployment demonstrations.

JSF IOT&E activities would not include any construction or other ground-disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures would occur. F-35 aircraft flying activities would adhere to all existing range restrictions and would be consistent with the existing environment on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges, and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Overall range activity would not be expected to change significantly under the Proposed Action. Therefore, the Proposed Action would not result in a significant change to conditions that would affect Native American or other traditional cultural resources. For these reasons, significant impacts to cultural resources are not expected.

The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'CJB', followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachment: Figure 1







JIM GIBBONS  
Governor

MICHAEL E. FISCHER  
Department Director

STATE OF NEVADA  
DEPARTMENT OF CULTURAL AFFAIRS

State Historic Preservation Office  
100 N. Stewart Street  
Carson City, Nevada 89701  
(775) 684-3448 • Fax (775) 684-3442  
[www.nvshpo.org](http://www.nvshpo.org)

RONALD M. JAMES  
State Historic Preservation Officer

September 25, 2009

Deborah Stockdale, PE  
Chief, Asset Management Flight  
99 CES/CEA  
4349 Duffer Drive Suite 1601  
Nellis Air Force Base NV 89191-7007

RE: Implementation of the F-35 Joint Strike Fighter Initial Operational Test and Evaluation Program, Clark, Lincoln, and Nye Counties.

Dear Deborah Stockdale:

The Nevada State Historic Preservation Office (SHPO) reviewed the subject undertaking. The SHPO concurs with the U.S. Air Force's determination that the proposed undertaking will not pose an effect to historic properties.

The SHPO notes that consultation with the affected Native American representatives was previously initiated. If this consultation results in the identification of properties of religious or cultural significance that could be affected by the undertaking, you must initiate additional consultation with this office concerning the National Register eligibility and possible effects of the undertaking.

If you have any questions concerning this correspondence, please contact me by phone at (775) 684-3443 or by e-mail at [Rebecca.Palmer@nevadaculture.org](mailto:Rebecca.Palmer@nevadaculture.org).

Sincerely,

Rebecca Lynn Palmer  
Review and Compliance Officer, Archaeologist





**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR

Katherine Slick, Director  
Department of Cultural Affairs  
Historic Preservation Division  
Bataan Memorial Building  
407 Galisteo Street, Suite 236  
Santa Fe, NM 87501

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

REFERENCE: National Historic Preservation Act of 1966, Section 106 (16 U.S.C. Section 470f) and Section 110 (16 U.S.C. Section 470h-2)

Dear Ms Slick:

We respectfully request the initiation of consultation under Sections 106 and 110 as the U.S. Department of the Air Force is early in the preparation process of an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E). A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

The JSF program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and IOT&E phases. This EA/OEA addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities, which would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on the attached Figure 1.

1) Basing the F-35 aircraft:

Edwards Air Force Base (AFB), California

2) Test Range Activities (airspace only)

Training and Proficiency Flights:

R-2508 Complex (Edwards AFB airspace)

Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges, California

Nevada Test and Training Range (NTTR), Nevada

Flight Testing:

R2508 Complex (Edwards AFB airspace)

Marine Corps Air Station (MCAS), Yuma Ranges, Arizona

National Training Center (NTC), Fort Irwin, California

NAWCWD, China Lake, California

NAWCWD, Point Mugu Ranges, California

NTTR, Nevada

Utah Test and Training Range (UTTR), Utah

White Sands Missile Range (WSMR), New Mexico

3) Deployment Demonstrations:

Alpena Combat Readiness Training Center (CRTC), Michigan

Edwards AFB

Eglin AFB, FL

Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California

MCAS Yuma, Arizona

NAS Lemoore, California

Carriers on the NAWCWD Point Mugu Ranges

Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

*Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB.

#### *Test Range Activities.*

Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or takeoff at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

Training and Proficiency Flights. Training and proficiency flights would occur during both test years. These include both pilot training flights and flights required to maintain pilot proficiency. No support aircraft would be used as part of the training/proficiency flights. Approximately 20 percent of all training and proficiency sorties would be flown during night (i.e., between sunset and sunrise). Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet above ground level (AGL) and approximately 5 percent of on-range flying time would be at supersonic speeds.

Test Flights. IOT&E flight test activities would generally consist of two F-35s or four F-35s flying in formation to evaluate the F-35's performance in representative combat scenarios. Each test flight would entail a takeoff and landing at Edwards AFB and test activities at one of several test locations. Approximately 20 percent of the test flight sorties would be flown during the night. Only approximately 5 percent of these flights would be flown below an altitude of 3,000 feet AGL, and approximately 5 percent of on-range flying time would be at supersonic speeds.

Transport planes like the C-17, aerial refuelers like the KC-10, and jet fighters representing opposition forces like the F-18, would be used to support the JSF flight testing activities. Support aircraft that would be used at each test location would be aircraft currently operating at that location and would be reassigned from other missions to support the JSF IOT&E. Therefore, support aircraft operations are considered part of the baseline condition at each test location.

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The area of potential effects (APE) for the proposed action in New Mexico is WSMR (Figure 2). WSMR is proposed as an alternate location to UTTR for air-to-air missile tests. Activities proposed for this location are test flights. Flight tests at WSMR would include F-35 aircraft flights, support aircraft flights, aerial target launches, and air-to-air live missile shots. Approximately 10 F-35 sorties would be flown approximately 20 hours in the WSMR airspace during each of the two test years. Approximately five aerial targets (drones) would be launched, and five air-to-air live missile shots would occur. The drones would be launched from and recovered at WSMR. No other ground activities would occur at WSMR.

JSF IOT&E activities would not include any construction or other ground-disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures would occur. F-35 aircraft flying activities would adhere to all existing range restrictions and would be consistent with the existing environment on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges, and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Overall range activity would not be expected to change significantly under the Proposed Action. Therefore, the Proposed Action would not result in a significant change to conditions that would affect Native American or other traditional cultural resources. For these reasons, significant impacts to cultural resources are not expected.

The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

Please contact me at (210) 536-4203 if you have any questions.

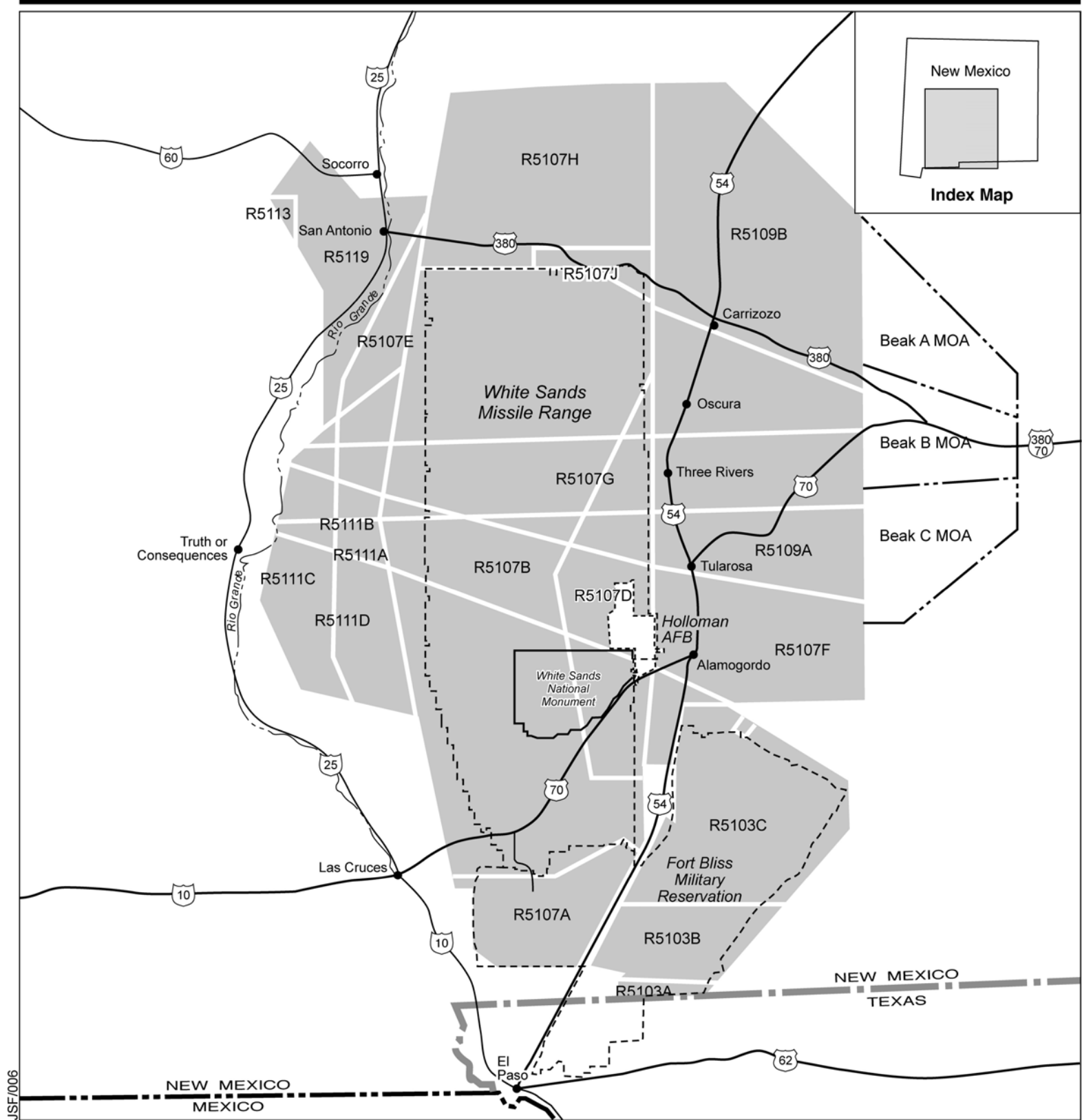
Sincerely,

A handwritten signature in black ink, appearing to read 'CJB', followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments: Figure 1  
Figure 2



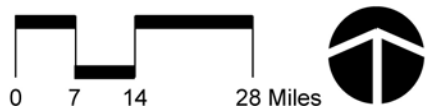


## EXPLANATION

- State Boundary
- U.S. Border
- Restricted Airspace
- Military Installation
- 70 U.S. Highway
- 10 Interstate Highway

- MOA Military Operations Area
- MOA Boundary

## White Sands Missile Range, New Mexico





DEPARTMENT OF THE AIR FORCE  
AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT  
BROOKS CITY- BASE TEXAS

087055



MEMORANDUM FOR

Katherine Slick, Director  
Department of Cultural Affairs  
Historic Preservation Division  
Bataan Memorial Building  
407 Galisteo Street, Suite 236  
Santa Fe, NM 87501

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

REFERENCE: National Historic Preservation Act of 1966, Section 106 (16 U.S.C. Section 470f) and Section 110 (16 U.S.C. Section 470h-2)

Dear Ms Slick:

We respectfully request the initiation of consultation under Sections 106 and 110 as the U.S. Department of the Air Force is early in the preparation process of an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E). A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

The JSF program is congressionally mandated to provide a family of strike fighter aircraft to fill many unique Air Force, Navy, and Marine mission requirements. The JSF test and evaluation program is comprised of Developmental Test and Evaluation (DT&E) and IOT&E phases. This EA/OEA addresses activities that would occur during the IOT&E test phase of the JSF Program.

JSF IOT&E activities would be conducted in two blocks that are anticipated to occur during two years from mid 2012 to mid 2014. Twenty F-35 aircraft based at Edwards AFB would be used to conduct the proposed activities, which would occur at multiple locations. The JSF IOT&E activities consist of three general types. These activities and the locations where they would occur are listed below. These locations are shown on the attached Figure 1.

- 1) Basing the F-35 aircraft:

The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

Please contact me at (210) 536-4203 if you have any questions.

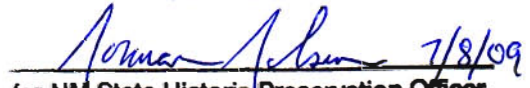
Sincerely,



CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachments: Figure 1  
Figure 2

**COMMENTS**

 7/8/09  
for NM State Historic Preservation Officer

We have no comments at  
this time — Thank you.



DEPARTMENT OF THE AIR FORCE  
75TH CIVIL ENGINEER GROUP (AFMC)  
HILL AIR FORCE BASE UTAH

21 August 2009

Mr. Robert T. Elliott  
Chief, Environmental Management Division  
75 CEG/CEV  
7274 Wardleigh Road  
Hill Air Force Base, Utah 84056-5137

Ms. Lori Hunsaker  
State Historic Preservation Officer  
300 Rio Grande  
Salt Lake City, Utah 84101

Dear Ms. Hunsaker

The United States Air Force (USAF) is currently proposing implementation of the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation Program. The proposed actions on lands administered by Hill Air Force Base (AFB) on the Utah Test and Training Range (UTTR) in Box Elder and Tooele Counties, Utah include test flights for pilot training and proficiency and drone launches. Test flight activities would include support aircraft flights and air-to-air missile tests and would occur during a two-year period, currently anticipated to be from mid-2012 to 2014.

Approximately 210 F-35 sorties would be flown in UTTR airspace, approximately five drones would be launched, and five air-to-air live missile shots would occur. The drones would be launched from and recovered at the UTTR. Operations would occur within existing airspace and would adhere to all existing restrictions and operating procedures established for these activities.

The project's Area of Potential Effect (APE) includes all USAF Military Operating Airspace in Utah (Attachment, UTTR Utah Military Operating Airspace). All federally-recognized American Indian tribes routinely consulted by Hill AFB regarding lands of the UTTR are being provided copies of the draft Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for review, comment, and/or consultation as they deem appropriate.

Significant to note on this proposed undertaking is that there will be no construction or modification to facilities on the UTTR. Similar fighter aircraft, such as the F-16 and F-22 have operated on the UTTR for a number of years. Noise produced by the F-35 is expected to be comparable to that from other jet fighters currently operating on the UTTR. Overall UTTR activity would not be expected to change significantly under the proposed action.

Therefore, Hill AFB has determined the proposed action will have no affect to historic properties and I request your concurrence on this determination as specified in 36 CFR §800.4(d). If you would like a copy of the EA/OEA to review, or should you or your staff have any questions, please contact our archaeologist, Ms. Jaynie Hirschi, 75th CEG/CEVOR at (801) 775-6920 or at jaynie.hirschi@hill.af.mil.

Sincerely

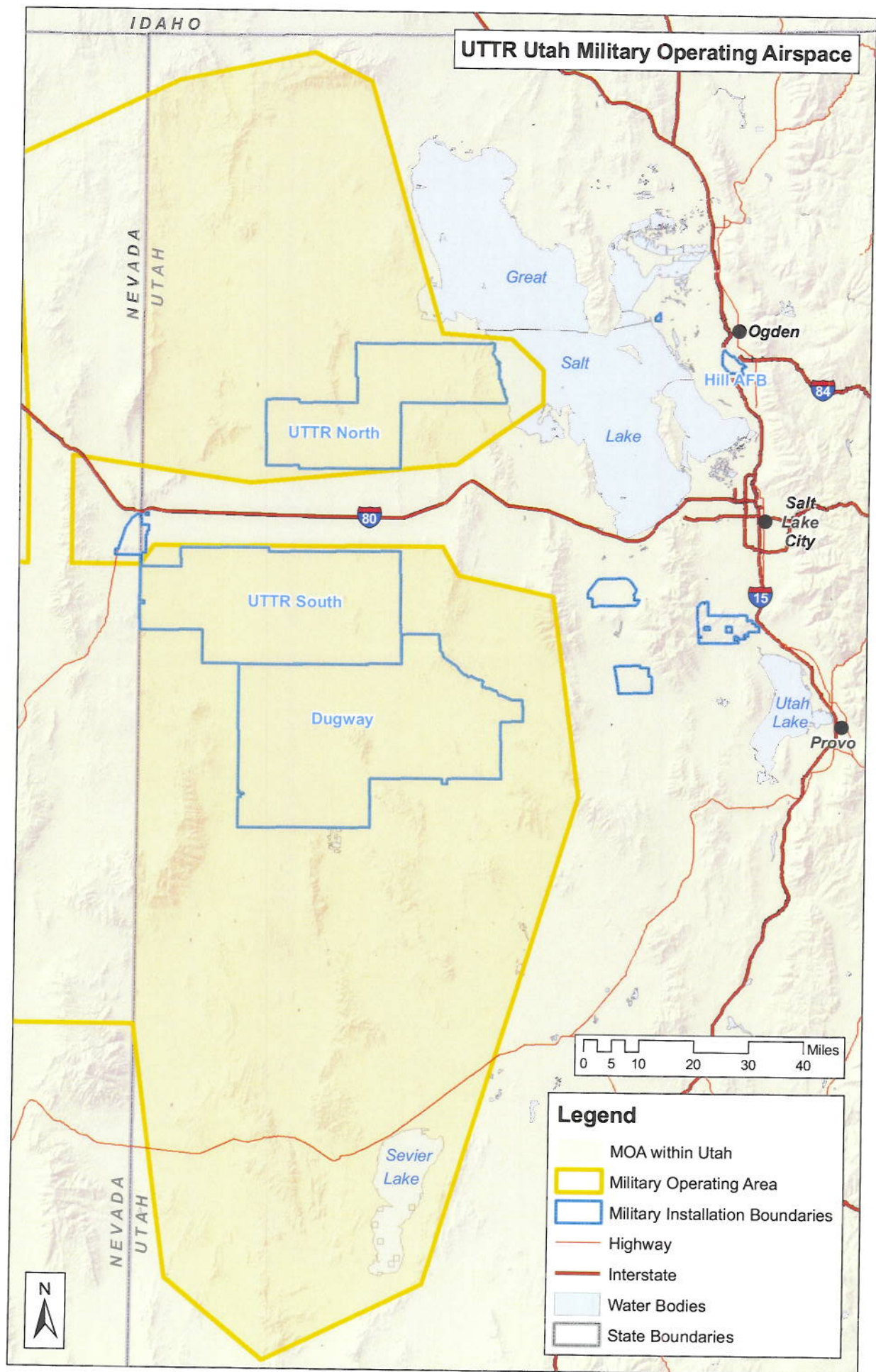


ROBERT T. ELLIOTT, P.E., YF-02, DAF  
Chief, Environmental Management Division  
75th Civil Engineer Group

Attachment:  
UTTR Utah Military Operating Airspace

cc:  
Mr. Charles J. Brown, Project Manager, AFCEE TDBS







## State of Utah

JON M. HUNTSMAN, JR.  
*Governor*

GARY R. HERBERT  
*Lieutenant Governor*

## Department of Community and Culture

PALMER DePAULIS  
*Executive Director*

### State History

PHILIP F. NOTARIANNI  
*Division Director*

August 27, 2009

Ms Jaynie Hirschi  
Archaeologist  
75th CEG/CEVOR  
7274 Wardleigh Road  
Hill Air Force Base UT 84056-5137

RE: F-35 JSF Initial Operational Test and Evaluation Program

In Reply Please Refer to Case No. 09-1186

Dear Ms. Hirschi: *Jaynie*

The Utah State Historic Preservation Office received your request for our comment on the above-referenced project on August 25, 2009. From the information you provided, it appears that no cultural resources were located in the project Area of Potential Effects. We concur with your determination of **No Historic Properties Affected** for this project.

This letter serves as our comment on the determinations you have made, within the consultation process specified in §36CFR800.4. If you have questions, please contact me at 801-533-3555 or [Lhunsaker@utah.gov](mailto:Lhunsaker@utah.gov) or contact Jim Dykmann at 801-533-3523 or [Jdykman@utah.gov](mailto:Jdykman@utah.gov)

Sincerely,

  
Lori Hunsaker  
Deputy State Historic Preservation Officer - Archaeology

UTAH STATE  
HISTORY

UTAH STATE HISTORICAL SOCIETY  
ANTIQUITIES  
HISTORIC PRESERVATION  
RESEARCH CENTER & COLLECTIONS

300 S. RIO GRANDE STREET, SALT LAKE CITY, UT 84101-1182 • TELEPHONE 801 533-3500 • FACSIMILE 801 533-3567 • HISTORY.UTAH.GOV



**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT**  
**BROOKS CITY- BASE TEXAS**

MEMORANDUM FOR

Michael E Stevens  
Wisconsin Historical Society  
816 State St.  
Madison, WI 53706-1482

FROM: HQ AFCEE/BC  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

SUBJECT: F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E)

REFERENCE: National Historic Preservation Act of 1966, Section 106 (16 U.S.C. Section 470f) and Section 110 (16 U.S.C. Section 470h-2)

Dear Mr. Stevens:

We respectfully request the initiation of consultation under Sections 106 and 110 as the U.S. Department of the Air Force is early in the preparation process of an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E). A copy of the draft EA will be posted at [www.afotec.af.mil](http://www.afotec.af.mil) for 30-day review beginning 21 June 2009. You may also request a hard copy by calling (909) 554-5052.

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- 1) Basing the F-35 aircraft:  
Edwards Air Force Base (AFB), California
- 2) Test Range Activities (airspace only)



Training and Proficiency Flights:

R-2508 Complex (Edwards AFB airspace)

Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu Ranges, California

Nevada Test and Training Range (NTTR), Nevada

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NAWCWD, Point Mugu Ranges, California

NTTR, Nevada

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Volk Field Air National Guard Base (ANGB), Wisconsin

A number of locations are suitable for deployment demonstrations. Those listed here are the currently identified preferred locations.

Brief descriptions of these activities are provided below.

*Basing Activities.*

The F-35 aircraft that would be used during the IOT&E phase would be based at Edwards AFB. Aircraft maintenance and flight preparation activities would occur as part of basing

the aircraft. All JSF IOT&E aircraft flights, except for those flown at other locations during deployment demonstrations, would originate and terminate at Edwards AFB.

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Test range activities consist of training and proficiency flights and test flights. These entail F-35 flights that originate and terminate at Edwards AFB, but that occur over one of several test ranges in the western U.S. The F-35 would not land or takeoff at any of these locations. Only the airspace over the ranges would be used for IOT&E activities. No ground-based activities would occur with the exception of a small number of target launches and weapons impacts that would occur at established target areas within a particular range.

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Missions involving weapons would be conducted during some test flights. Air-to-ground weapon release missions entail release of inert or live weapons from the F-35 aircraft over a range, but no firing of weapons from the F-35 at targets. Air-to-air live missile shot missions include firing weapons from the F-35 aircraft at an aerial target that has been launched from a ground location. These activities would occur in established target areas within a particular test range and would be accomplished in compliance with all established standard operating procedures.

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The area of potential effects (APE) for the proposed action in Wisconsin is the Volk Field ANGB. Volk Field ANGB is a proposed location for two deployment demonstrations, one during each block.

JSF IOT&E activities would not include any construction or other ground-disturbing activities that could affect archaeological resources. No modification of buildings that could potentially affect historic structures would occur. F-35 aircraft flying activities would adhere to all existing range restrictions and would be consistent with the existing environment on the test ranges. Similar fighter aircraft, such as F-16 and F-22, have operated on the test ranges for a number of years. In addition, JSF test activities would not be additive to the total operations currently conducted at the test ranges. Similar test activities would be conducted at the test ranges, and JSF, being a higher priority user, would replace lower priority activity during IOT&E as necessary. Overall range activity would not be expected to change significantly under the Proposed Action. Therefore, the Proposed Action would not result in a significant change to conditions that would affect Native American or other traditional cultural resources. For these reasons, significant impacts to cultural resources are not expected.

The Air Force appreciates your review of our project activities and looks forward to your concurrence with our determination of effects.

Please contact me at (210) 536-4203 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'CJB', followed by a horizontal line.

CHARLES J. BROWN, P.E., YF-02, DAF  
AFCEE TDBS, Project Manager

Attachment: Figure 1



July 2, 2009

Mr. Charles Brown  
AFCEE/TDBS  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

**IN REPLY PLEASE REFER TO CASE #09-0510JU**  
RE: F-35 Joint Strike Fighter Test & Evaluation  
ID: Volk Field, Juneau County, Wisconsin

Dear Mr. Brown:

We have reviewed the above-referenced project as required for compliance with Section 106 of the National Historic Preservation Act and 36 CFR Part 800: Protection of Historic Properties, the regulations of the Advisory Council on Historic Preservation governing the Section 106 review process.

We believe the program, as currently proposed, will have no effect on historic properties located within the area of potential effect of the proposed undertaking.

We remind you that the regulations of the Advisory Council on Historic Preservation include the requirement that you seek information, as appropriate to the undertaking, from parties likely to have knowledge of or concerns with historic properties in the project area - such as Indian tribes, local governments, local landmark commissions and public and private organizations.

If there are any questions concerning this matter, I may be reached at (608) 264-6505.

Sincerely,

Dan Duchrow  
Division of Historic Preservation  
and Public History

The accompanying Notice of Availability ran in the newspapers listed below on the corresponding dates.

Alamogordo Daily News	06/21/2009
Alpena News	06/27/2009
Antelope Valley Press	06/21/2009
Desert Dispatch	06/21/2009
Desert Trail	06/18/2009
Inyo Register	06/20/2009
Juneau County Star-Times	06/20/2009
Las Vegas Review Journal	06/21/2009
Lemoore Advance	06/25/2009
Northwest Florida Daily News	06/21/2009
Ridgecrest Daily Independent	06/20-21/2009
Salt Lake Tribune	06/21/2009
Ventura County Star	06/21/2009
Yuma Sun	06/21/2009



## **NOTICE OF AVAILABILITY**

### **DRAFT ENVIRONMENTAL ASSESSMENT/ OVERSEAS ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT**

#### **F-35 Joint Strike Fighter Initial Operational Test and Evaluation**

A Draft Environmental Assessment/Overseas Assessment (EA/OEA) and Finding of No Significant Impact (FONSI), dated June 2009 has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality regulations implementing NEPA. The Draft EA/OEA analyzes the potential impacts resulting from the proposed F-35 Joint Strike Fighter (JSF) Initial Operational Test and Evaluation (IOT&E) program. IOT&E consists of conducting pilot training and test range flight activities using F-35 aircraft based at Edwards AFB, CA. These activities would occur at several test ranges in the U.S. Several deployment demonstrations at locations in multiple states would also be conducted. The following alternatives have been addressed in the EA/OEA:

- The **Proposed Action** is conducting the JSF tests at the locations analyzed in the EA.
- The **No-Action Alternative** is not conducting the JSF tests at the locations analyzed in the EA.

The Draft EA/OEA and FONSI are available for review at:

[www.afotec.af.mil](http://www.afotec.af.mil)

You may also request a hard copy by calling (909) 554-5052.

Public comments on the Draft EA/OEA and FONSI must be received by July 22, 2009. Written comments and inquiries on the documents may be forwarded by mail to the address below or by e-mail to [charlie.brown@brooks.af.mil](mailto:charlie.brown@brooks.af.mil).

Mr. Charles Brown  
HQ AFCEE/TDBS  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

Your comments on this Draft EA/OEA and FONSI are requested. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the Final EA/OEA. Personal home addresses and telephone numbers will not be published in the Final EA/OEA.





BILL RICHARDSON  
Governor

NEW MEXICO  
ENVIRONMENT DEPARTMENT

*Office of the Secretary*

Harold Runnels Building  
1190 Saint Francis Drive (87505)  
PO Box 5469, Santa Fe, NM 87502-5469  
Phone (505) 827-2855 Fax (505) 827-2836  
[www.nmenv.state.nm.us](http://www.nmenv.state.nm.us)



RON CURRY  
Secretary  
Jon Goldstein  
Deputy Secretary

July 7, 2009

Mr. Charles Brown  
AFCEE/TDBS  
3300 Sidney Brooks  
Brooks City-Base, TX 78235-5112

**RE:** Draft Environmental Assessment/Overseas Environmental Assessment and Finding of No Significant Impact for the F-35 Joint Strike Fighter Initial Operational Testing and Evaluation

Dear Mr. Brown:

Your letter regarding the above named project was received in the New Mexico Environment Department (NMED) and was sent to various Bureaus for review and comment. Comments were provided by the Air Quality Bureau and are as follows.

**Air Quality Bureau**

White Sands Missile Range (WSMR) occupies several New Mexico counties all are considered in attainment with New Mexico and National Ambient Air Quality Standards; however, a portion of WSMR is located in Doña Ana County. Please be advised that although Doña Ana County is currently considered to be in attainment with the National Ambient Air Quality Standards (NAAQS) and New Mexico ambient air quality standards, a Natural Events Action Plan (NEAP) has been developed for wind blown dust in Doña Ana County. As part of the NEAP, White Sands Missile Range signed a memorandum of agreement (MOA) with the New Mexico Environment Department in support of the NEAP.

The project as proposed should have no long-term significant impacts to ambient air quality

I hope this information is helpful to you.

Sincerely,

Jill Turner for: Georgia Cleverley  
Environmental Impact Review Coordinator  
NMED File #2880







ARNOLD SCHWARZENEGGER  
GOVERNOR

July 23, 2009

STATE OF CALIFORNIA  
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH  
STATE CLEARINGHOUSE AND PLANNING UNIT



CYNTHIA BRYANT  
DIRECTOR

Charles J. Brown  
U.S. Air Force, Air Force Center for Engineering  
3300 Sidney Brooks  
Barks City-Base, TX 78235-5112

Subject: F-35 Joint Strike Fighter Initial Operational Test and Evaluation  
SCH#: 2009064004

Dear Charles J. Brown:

The State Clearinghouse submitted the above named Environmental Assessment to selected state agencies for review. The review period closed on July 22, 2009, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts  
Director, State Clearinghouse

**Document Details Report  
State Clearinghouse Data Base**

**SCH#** 2009064004  
**Project Title** F-35 Joint Strike Fighter Initial Operational Test and Evaluation  
**Lead Agency** U.S. Air Force

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**Type** EA Environmental Assessment

**Description** NOTE: Review Per Lead

The purpose of the Proposed Action is to test the operational capabilities of the operationally representative F-35 aircraft under realistic "combat" conditions. This EA/OEA analyzes the potential environmental impacts from basing 20 F-35 aircraft at Edwards AFB, conducting pilot training and proficiency flights and test flights in several test ranges in the western U.S., and conducting a series of deployment demonstration at multiple locations. Test flight activities would include weapons missions at several ranges. Operations would occur within existing airspace and test ranges and would adhere to all existing restrictions and operating procedures established for these activities. No construction or modification of facilities would occur. The No-Action Alternative would be not to conduct the JSF IOT&E program.

---

**Lead Agency Contact**

**Name** Charles J. Brown  
**Agency** U.S. Air Force, Air Force Center for Engineering  
**Phone** 210-536-4203 **Fax**  
**email**  
**Address** 3300 Sidney Brooks  
**City** Barks City-Base **State** TX **Zip** 78235-5112

---

**Project Location**

**County** Los Angeles, Kern, San Bernardino  
**City**  
**Region**  
**Lat / Long**  
**Cross Streets** Edwards AFB  
**Parcel No.**  
**Township**

**Range**

**Section**

**Base**

---

**Proximity to:**

**Highways**  
**Airports**  
**Railways**  
**Waterways**  
**Schools**  
**Land Use**

---

**Project Issues** Air Quality; Biological Resources; Noise

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**Reviewing Agencies** Resources Agency; Department of Fish and Game, Headquarters; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; California Highway Patrol; Caltrans, Division of Transportation Planning; State Water Resources Control Board, Division of Water Quality; Regional Water Quality Control Board, Region 7; Department of Toxic Substances Control; Native American Heritage Commission

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**Date Received** 06/24/2009 **Start of Review** 06/24/2009 **End of Review** 07/22/2009



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Nevada Fish and Wildlife Office

1340 Financial Blvd., Suite 234

Reno, Nevada 89502

Ph: (775) 861-6300 ~ Fax: (775) 861-6301



July 24, 2009

File No. 84320-2009-FA-0114

Mr. Charles J. Brown, PE  
Project Manager  
Air Force Center for Engineering and the Environment  
3300 Sidney Brooks  
Brooks City-Base, Texas 78235

Dear Mr. Brown:

Subject: Comments on the Draft Environmental Assessment for the Joint Strike Fighter Initial Operational Test and Evaluation on the Nevada Test and Training Range, Nye County, Nevada

Thank you for the opportunity to comment on the Draft Environmental Assessment (EA) for the Joint Strike Fighter (JSF) Initial Operational Test and Evaluation on the Nevada Test and Training Range (NTTR) in Nye County, Nevada. On June 17, 2009, we received your request for input on the Draft EA. This memorandum has been prepared under the authority of and in accordance with provisions of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.; 83 Stat. 852], as amended, the Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.; 87 Stat. 884], as amended (Act), and other authorities mandating the Fish and Wildlife Service's (Service) concern for environmental values. Based on these authorities, the Service offers the following comments for your consideration.

We understand that the JSF program is congressionally mandated to provide a family of strike fighter aircraft to fill Air Force, Navy and Marine mission requirements. The JSF program would include pilot training and test flights, and inert weapon release missions that would be conducted within the NTTR.

We are concerned that the proposed project would impact the federally listed as threatened desert tortoise (*Gopherus agassizii*) (Mojave population) and its habitat. Habitat loss and degradation are major threats to the recovery of this species. As you are aware, the Service issued, under section 7 of the Act, a programmatic biological opinion (BO) for training activities at NTTR. We recommend that you review this programmatic BO to ensure the proposed activities can be appended to the programmatic BO. Although the proposed project may be covered under the programmatic BO, under NEPA the final EA should disclose project impacts to the desert

tortoise and its habitat, and provide avoidance and minimization measures for impacts to desert tortoise as appropriate.

The Service also has conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et seq.*). Projects should be evaluated for potential impacts to migratory birds in the area. Under the MBTA, nests (nests with eggs or young) of migratory birds may not be harmed, nor may migratory birds be killed. Such destruction may be in violation of the MBTA. Therefore, we recommend any surface disturbance associated with proposed activities, be conducted outside the avian breeding season to avoid potential destruction of bird nests or young, or birds that breed in the area. If this is not feasible, we recommend a qualified biologist survey the area prior to any surface disturbance. If nests are located, or if other evidence of nesting (*i.e.*, mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the area avoided to prevent destruction or disturbance to nests until they are no longer active.

We are concerned about project impacts to the banded Gila monster (*Heloderma suspectum cinctum*), a species protected under the Nevada Administrative Code 503.080 and listed as sensitive by the Nevada Natural Heritage Program (Heritage Program). The banded Gila monster occurs primarily in the Mojave Desert scrub and salt desert scrub ecosystems in southern Nevada, southeastern California, southwestern Utah, and western Arizona. The banded Gila monster is one of only two venomous lizard species in the world. Gila monsters are difficult to locate as they spend the majority of the year in underground burrows; however, illegal collection, construction of roads, and loss of habitat continue to threaten this sensitive species. Given that the Gila monster is known to occur within the geographic area, we recommend that you evaluate project impacts to any existing populations and suitable habitat for this species in the final EA. If it is determined that the project may result in impacts to Gila monsters, we suggest that you contact the Nevada Department of Wildlife to minimize and mitigate impacts to this species as appropriate.

We are concern about potential project impacts to the Clokey eggvetch (*Astragalus oophorus* var. *clokeyanus*), a species considered rare under the Heritage Program. Two of the 23 known Clokey eggvetch populations occur within the Belted Range and in the vicinity of the Cliff Springs target complex in the NTTR. Because populations are typically small in number and area, the Clokey eggvetch is highly vulnerable to human disturbance and stochastic events including drought, fire, flooding and invasion by nonnative species. Populations in the Spring Mountains, the only other known location for this species, have been impacted by disturbance from recreation and other uses. The final EA should include an analysis of possible direct and indirect impacts to this rare species as a result of implementation of the proposed project. We ask that you include in the final EA, measures to avoid potential impacts to Clokey eggvetch populations as appropriate.

We are also concerned about potential project impacts to cliff needlegrass (*Stipa shoshoneana*), a species listed on the Heritage Program's watch list. Species listed under the Heritage Program's watch list are species that could be declining in Nevada or across a large portion of their range and/or less common than currently thought and, as a result, could become at-risk in the future. We recommend that the final EA disclose possible impacts to cliff needlegrass as a result of implementation of the proposed project. We ask that you include in the final EA measures to avoid, minimize or offset potential impacts to this species as appropriate.

We appreciate the opportunity to comment on the Draft EA for the proposed JSF Initial Operational Test and Evaluation on the NTTR. If you have any questions regarding these comments, please contact Leilani Takano in the Nevada Fish and Wildlife Office at (702) 515-5230.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert D. Williams".

for

Robert D. Williams  
State Supervisor



From: Dyas, Keith Civ USAF AFMC 95 ABW/EM  
Sent: Friday, July 24, 2009 2:10 PM  
To: Brown, Charlie J Civ USAF AFCEE AFCEE/TDBS  
Cc: Gries, Bill Civ USAF AFMC 412 OSS/OSAA  
Subject: FW: My Comments on the JSF EA

Charlie,

Mr. Bill Gries (EAFB Airspace manager) provides the attached comments on the draft EA.

Keith

-----Original Message-----

From: Gries, Bill Civ USAF AFMC 412 OSS/OSAA  
Sent: Friday, July 24, 2009 12:00 PM  
To: Dyas, Keith Civ USAF AFMC 95 ABW/EM  
Subject: My Comments on the JSF EA



## JSF EA Comments

General Comment: The term “R-2508 Complex” is used throughout the document to refer to Edwards AFB when this term is used to define the airspace consisting of Restricted Areas, MOAs and ATCAAs. Suggest a search and replace be used...just one example Table 4.2-4...this should read Edwards AFB not R-2508 Complex. Care needs to be taken since page 4-14 line 24 is stated correctly.

Page 1 Line 31-34...Although stating noise levels are comparable to current airframes but “would slightly increase” is inserted. Would this require a new AICUZ?

Page 1-7 lines 2 and 7...remove parenthesis and airspace after Edwards AFB

Page 2-7 line 9...states “would primarily use military operations areas (MOAs)”. This means flight operations will NOT go about FL180. Suggest inserting after “(MOAs)” “and associated Air Traffic Control Assigned Airspace (ATCAAs)”. ATCAAs associated with the MOAs within the R2508 complex would then allow flight to FL600. Then immediately after this sentence insert “These MOAs/ATCAAs are the...” You would have to check to see if Nellis and Mugu have ATCAAs.

Page 2-7 line 36...suggest adding after military “Special Use Airspace (SUA)” and deleting “use airspace”

Page 2-11 lines 27 thru 31 replace with: “Edwards AFB is surrounded by the R-2508 Complex which includes all the internal restricted areas, MOAs and associated ATCAAs (Figure 2.2-2). These areas would be used for test range activities including both pilot training, proficiency flights and test flights. Table 2.2-5 provides a summary of the JSF IOT&E activities proposed for the R-2508 Complex.”

Page 2-12 Figure 2.2-2...Suggest replacing this figure with one which also depicts the MOAs. The bold print lower right side should use the term “Special” instead of “Associated” and eliminate the word “California” since the state’s name is clearly visible on the map. Case in point for inserting the other MOA names...Porterville, Shoshone and the other external MOAs and shown but not the internal ones such as saline Owens etc.

Page 2-13 line 2-3...replace “in the R-2508 and R-2515 airspaces at Edwards AFB.” with “within the R-2508 Complex surrounding Edwards AFB.” This then takes into account all the internal restricted areas and associated MOAs/ATCAAs.

Page 2-15 line 3 and 4, page 2-17 line 22-23: Thought the pilot training and proficiency flights were to occur at Edwards while the other ranges would be test flights.

Comment for “Pilot Training and Proficiency Flights” page 2-11 states these flights will occur within the R2508 Complex but yet page 2-15 line 15 and page 2-17 line 29 talks to this same area. Suggest renaming these two page topics to “**Pilot Sorties.**” In table 2.2-5 it states 720 Training/Proficiency sorties for R2508 Complex, Table 2.2-8 same numbers and Table 2.2-10 same numbers. If all Profs and Pilot Training flights will occur at Edwards then eliminate the 720 in each table and insert a zero.

Page 2-18 Figure 2.2-4...map is incorrect. Reville MOA is divided into a north and south MOA.

Page 3-1 lines 44-45...suggest changing “includes restricted areas R-2508 and R-2515 and adjacent MOAs which overlie portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties (see Figure 2.2-2).” to read “includes restricted areas R-2508, R-2502N, R-2502E, R-2505, R-2506, R-2524, R-2515 and associated MOAs and ATCAAs which overlie portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties (see Figure 2.2-2).” This provides a more accurate definition of the R2508 Complex than just the original sentence.

Page 3-1 lines 46-49 to page 3-2 line 1...eliminate after “(see Figure 2.2-2)” to “however, because”. Then begin a new sentence with “JSF IOT&E”....

Page 3-2 lines 4-7 replace with “Management of military aircraft operations in the R-2508 Complex is performed by the R-2508 Joint Policy and Planning Board, which consists of the Commanders at Edwards AFB, NAWCWD and NTC Fort Irwin.”

Page 3-2 line 40...2521 should read “2524”

Page 3-2 line 40...question: How is R2506 proposed to be used? The altitude cap is 6000 MSL.

Page 3-3 line 16...change “comprised of airspace” to read “comprised of Special Use Airspace”.

Page 3-17 lines 16-18...I thought we did have an AICUZ or was it just a noise stud?.



**From:** Nichols David SMSgt MICRTC/CC SEG [david.nichols@micrtc.af.mil]  
**Sent:** Monday, July 20, 2009 10:31 AM  
**To:** Rykaczewski, Carl  
**Subject:** Review of Public Draft EA/OEA for Joint Strike Fighter IOT&E

Mr. Rykaczewski:

I have completely reviewed the Draft EA/OEA for the Joint Strike Fighter IOT&E and have found no significant issues with the document and the conclusions that were made in the document. It was very interesting to read and found it to be informative.

I am currently the acting Environmental Management Officer for the Alpena CRTC located in Alpena, MI.

I noted that a Mr. Charles Brown from AFCEE is the person to send comments to on the document. I did try calling his office but there was no answer.

I would like to thank you for sending the document so that we could do the review.

DAVID L. NICHOLS, SMSgt, MIANG  
Ground/Weapons Safety Manager  
Acting EMO

FW Draft EA/OEA for Joint Strike Fighter IOTE

-----Original Message-----

From: Marek, Kevin P CIV USAF ANG NGB/A7AM [mailto:kevin.marek@ang.af.mil]  
Sent: Monday, June 29, 2009 8:12 AM  
To: Brown, Charlie J CIV USAF AFCEE AFCEE/TDBS  
Cc: Lippert, Stephen R Maj USAF ANG NGB/A7AM  
Subject: FW: Draft EA/OEA for Joint Strike Fighter IOT&E

Charlie:

Comments from Volk Field.

Thanks for the chance to review.

KEVIN.MAREK@ANG.AF.MIL  
NGB/A7AM  
Conaway Hall  
3500 Fetchet Ave  
301-836-8855  
DSN 278-8855

-----Original Message-----

From: Dunlap, Michael J Maj USAF ANG WI CRTC/EM  
Sent: Friday, June 26, 2009 10:59 AM  
To: Marek, Kevin P CIV USAF ANG NGB/A7AM  
Subject: FW: Draft EA/OEA for Joint Strike Fighter IOT&E

Kevin,

Volk Field only has the following 2 comments on the Draft EA/OEA. I sent them to you for consolidation. I'll let you send them to AFCEE.

-----Original Message-----

From: Gonnering, Daniel D CIV USAF ANG WI CRTC/EM  
Sent: Monday, June 22, 2009 3:05 PM  
To: Dunlap, Michael J Maj USAF ANG WI CRTC/EM  
Subject: RE: Draft EA/OEA for Joint Strike Fighter IOT&E

Two comments for me;

1. general - Read the copy of the letter to the public but could not find local outlets i.e. news paper, to let the public know the document is available for review.
2. page 3-42, table 3.4-11 - The grey wolf was delisted march 12, 2007.

Daniel D. Gonnering  
Natural Resource Manager  
Volk Field CRTC  
100 Independence Drive  
Camp Douglas WI 54618  
(608)427-1397 FAX (608)427-1382  
DSN 871-1397 DSN FAX 871-1382

CE Front Desk (608)427-1226

31 July 2009

Kevin O'Berry, Intergovernmental Liaison  
56th Fighter Wing Range Management Office  
7224 N 139th Drive  
Luke AFB AZ 85309

Sherry Cordova, Chairman  
Cocopah Tribe  
County 15 and Ave G  
Somerton AZ 85350

Subject: Draft Environmental Assessment (EA), Operational Testing, F-35

Dear Chairman Cordova

I am enclosing a copy of the above-referenced draft EA prepared by Edwards Air Force Base (AFB), California. A copy has been forwarded to Jill McCormick, Cultural Resources Manager, by e-mail. The EA was not initially sent to interested tribes; however, the comment period has been extended.

The purpose of the Proposed Action is to test the operational capabilities of the F-35 aircraft under realistic "combat" conditions. This EA/OEA analyzes the potential environmental impacts from basing 20 F-35 aircraft at Edwards AFB, conducting pilot training and proficiency flights and test flights in several test ranges in the western U.S., and conducting a series of deployment demonstrations at multiple locations. Test flight activities would include weapons missions at several ranges. Operations would occur within existing airspace and test ranges and would adhere to all existing restrictions and operating procedures established for these activities. No construction or modification of facilities would occur.

The Proposed Action would entail conducting flights from Edwards AFB in nearby airspace including: the R-2508 Complex (Edwards AFB airspace); Naval Air Warfare Center Weapons Division (NAWCWD) China Lake, California; NAWCWD Point Mugu Ranges, California; Nevada Test and Training Range, Nevada; Utah Test and Training Range, Utah; White Sands Missile Range, New Mexico; National Training Center Fort Irwin, California; and Marine Corps Air Station (MCAS) Yuma Ranges, Arizona and California.

Currently identified preferred locations for conducting deployment demonstrations are Alpena Combat Readiness Training Center, Michigan; Edwards AFB; Eglin AFB, Florida; Marine Corps Air Ground Combat Center Twentynine Palms, California; MCAS Yuma; Naval Air Station

Lemoore, California; Volk Field Air National Guard Base, Wisconsin; and aircraft carriers operating on the NAWCWD Point Mugu Ranges.

The proposed activities would occur during a two-year period currently anticipated to be from mid-2012 to mid-2014.

The enclosed EA indicates that an unspecified portion of 860 JSF sorties will be flown during the test period on the ranges controlled by MCAS Yuma, which include the Chocolate Mountains Range, the Kofa Range at the Yuma Proving Ground, and the BMGR West. Also, about 40 sorties will land at MCAS Yuma for a separate phase of testing.

A draft *Finding of No Significant Impact* indicates that air emissions from Proposed Action activities would be *de minimis* and would not be regionally significant. Noise levels at the Edwards AFB airfield would increase due to F-35 take-offs and landings during IOT&E. This increase in noise levels would not exceed the significance threshold established by the Federal Aviation Administration. Noise produced by the F-35 is expected to be comparable to that from other jet fighters currently operating on the test ranges. The proposed deployment demonstrations would slightly increase the overall frequency of aircraft flight noise events at each site, but with a barely perceptible noise increase in each flight event. The proposed JSF IOT&E activities would be consistent with existing ongoing range activities, including aircraft flight altitudes, speeds, overflight avoidance areas, and temporal restrictions. Target launches and weapons releases would use only established launch and target locations.

If you have questions or concerns about the proposed action, please call me at 623-856-5857. Written input may be sent to me at the above address. Edwards AFB would like to receive input by 10 August. If the Cocopah Tribe would like to provide input, but is unable to do so by that date, please let me know when we can expect it.

Sincerely

KEVIN M. O'BERRY, YA-02, DAF

Attachment  
Draft EA

31 July 2009

Kevin O'Berry, Intergovernmental Liaison  
56th Fighter Wing Range Management Office  
7224 N. 139th Drive  
Luke AFB AZ 85309

Mike Jackson, Sr., President  
Fort Yuma-Quechan Tribe  
P.O. Box 1899  
Yuma AZ 85366-1899

Subject: Draft Environmental Assessment (EA), Operational Testing, F-35

Dear President Jackson

I am enclosing a copy of the above-referenced draft EA prepared by Edwards Air Force Base (AFB), California. A copy has been forwarded to Bridget Nash-Chrabasz, Quechan Tribal Historic Preservation Officer, by e-mail. The EA was not initially sent to interested tribes; however, the comment period has been extended.

The purpose of the Proposed Action is to test the operational capabilities of the F-35 aircraft under realistic "combat" conditions. This EA/OEA analyzes the potential environmental impacts from basing 20 F-35 aircraft at Edwards AFB, conducting pilot training and proficiency flights and test flights in several test ranges in the western U.S., and conducting a series of deployment demonstrations at multiple locations. Test flight activities would include weapons missions at several ranges. Operations would occur within existing airspace and test ranges and would adhere to all existing restrictions and operating procedures established for these activities. No construction or modification of facilities would occur.

The Proposed Action would entail conducting flights from Edwards AFB in nearby airspace including: the R-2508 Complex (Edwards AFB airspace); Naval Air Warfare Center Weapons Division (NAWCWD) China Lake, California; NAWCWD Point Mugu Ranges, California; Nevada Test and Training Range, Nevada; Utah Test and Training Range, Utah; White Sands Missile Range, New Mexico; National Training Center Fort Irwin, California; and Marine Corps Air Station (MCAS) Yuma Ranges, Arizona and California.

Currently identified preferred locations for conducting deployment demonstrations are Alpena Combat Readiness Training Center, Michigan; Edwards AFB; Eglin AFB, Florida; Marine Corps



Air Ground Combat Center Twentynine Palms, California; MCAS Yuma; Naval Air Station Lemoore, California; Volk Field Air National Guard Base, Wisconsin; and aircraft carriers operating on the NAWCWD Point Mugu Ranges.

The proposed activities would occur during a two-year period currently anticipated to be from mid-2012 to mid-2014.

The enclosed EA indicates that an unspecified portion of 860 JSF sorties will be flown during the test period on the ranges controlled by MCAS Yuma, which include the Chocolate Mountains Range, the Kofa Range at the Yuma Proving Ground, and the BMGR West. Also, about 40 sorties will land at MCAS Yuma for a separate phase of testing.

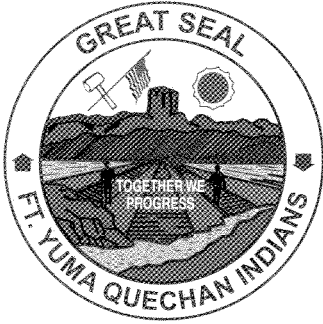
A draft *Finding of No Significant Impact* indicates that air emissions from Proposed Action activities would be *de minimis* and would not be regionally significant. Noise levels at the Edwards AFB airfield would increase due to F-35 take-offs and landings during IOT&E. This increase in noise levels would not exceed the significance threshold established by the Federal Aviation Administration. Noise produced by the F-35 is expected to be comparable to that from other jet fighters currently operating on the test ranges. The proposed deployment demonstrations would slightly increase the overall frequency of aircraft flight noise events at each site, but with a barely perceptible noise increase in each flight event. The proposed JSF IOT&E activities would be consistent with existing ongoing range activities, including aircraft flight altitudes, speeds, overflight avoidance areas, and temporal restrictions. Target launches and weapons releases would use only established launch and target locations.

If you have questions or concerns about the proposed action, please call me at 623-856-5857. Written input may be sent to me at the above address. Edwards AFB would like to receive input by 10 August. If the Quechan Tribe would like to provide input, but is unable to do so by that date, please let me know when we can expect to receive it.

Sincerely

KEVIN O'BERRY, YA-02, DAF

Attachment  
Draft EA



**QUECHAN INDIAN TRIBE**  
*Ft. Yuma Indian Reservation*

P.O. Box 1899  
Yuma, Arizona 85366-1899  
Phone (760) 572-0213  
Fax (760) 572-2102

September 3, 2009

Department of the Air Force  
56<sup>th</sup> Range Management Office  
Mr. Kevin O'Berry  
7224 North 139<sup>th</sup> Drive  
Luke AFB, AZ 85309

Dear Mr. O'Berry,

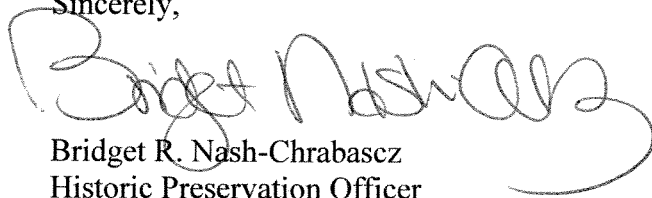
Thank you for notifying us of the proposed draft EA for the operational testing of the F-35.

We have reviewed the draft EA received on August 10, 2009 and understand that the EA is not evaluating the basing of the aircraft, only the operational testing and that only existing facilities, runways, etc., will be utilized for the operational testing.

We would like to reiterate previous requests that if there is to be any ground disturbance associated with the construction of facilities or runways for the F-35 or with the landing of the aircraft in the desert, that the Tribe be consulted with prior to the POD as there are resources affiliated with the Tribe located in the area.

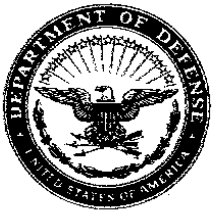
Again, we thank you for your notification. If you need any further information or have any questions, please contact me at (760) 572-2423.

Sincerely,



Bridget R. Nash-Chrabascz  
Historic Preservation Officer





**DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 95TH AIR BASE WING (AFMC)  
EDWARDS AIR FORCE BASE CALIFORNIA**

Mr. Robert W. Wood, Director  
95th Air Base Wing Environmental Management Directorate  
5 East Popson Avenue  
Edwards Air Force Base, California 93524-8060

Chemehuevi Reservation  
Colorado River Agency  
Mr. Charles F. Wood, Chairperson  
Post Office Box 1976  
Havas Lake, California 92363

Dear Mr. Wood

Subject: Draft *Environmental Assessment/Overseas Environmental Assessment* (EA/OEA)  
*F-35 Joint Strike Fighter Initial Operational Testing and Evaluation*

The 95th Air Base Wing Environmental Management Directorate and Air Force Center for Engineering and the Environment (AFCEE) are pleased to provide you with the subject document, including the Finding of No Significant Impact, for your review. The draft EA/OEA has been prepared in accordance with the *National Environmental Policy Act* to analyze the potential environmental consequences of the proposed action.

At Edwards Air Force Base (AFB), this EA includes analyzing the basing of 20 F-35 aircraft, conducting pilot training and proficiency flights and test flights in several ranges in the western United States, and conducting a series of deployment demonstration at multiple locations. Test flight activities would include weapons missions at several ranges. Operations would occur within existing airspace and test ranges and would adhere to all existing restrictions and operating procedures established for these activities.

Significant to note on this proposed undertaking is that there will be no construction or modification of facilities at Edwards AFB; therefore, existing base facilities will accommodate this added program with no changes.

In order to provide adequate time for your review and submission of comments regarding this EA/OEA, we request that your comments be received by Dr. David Ruggles by 24 August 2009 at:

Dr. David Ruggles  
95th Air Base Wing Environmental Management Directorate  
Conservation Division, Cultural Resources  
5 East Popson Avenue  
Edwards AFB, California 93524-8060

Environmental Management and AFCEE sincerely appreciate your support and look forward to receiving and consulting on any comments you may submit regarding this EA/OEA. Additionally, please feel free to contact Dr. Ruggles, at david.ruggles@edwards.af.mil or 661-277-7077, with any questions you may have while conducting your review.

Sincerely

A handwritten signature in black ink, appearing to read 'Robert W. Wood', written in a cursive style.

ROBERT W. WOOD

Attachment:  
Draft EA/OEA with compact disk

Please note that a similar letter was also sent to:

- Colorado River Indian Tribes Tribal Council
- Morongo Band of Mission Indians
- San Manuel Band of Mission Indians



DEPARTMENT OF THE AIR FORCE  
75TH CIVIL ENGINEER GROUP (AFMC)  
HILL AIR FORCE BASE UTAH

19 August 2009

Mr. Robert T. Elliott  
Chief, Environmental Management Division  
75th CEG/CEV  
7274 Wardleigh Road  
Hill Air Force Base, Utah 84056-5137

Mr. Anthony Addison, Sr.  
Chairperson, Northern Arapaho Tribe  
PO Box 396  
Fort Washakie, WY 82514

Dear Chairperson Addison

Subject: Draft *Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter Initial Operational Testing and Evaluation*

The Hill Air Force Base (AFB) 75 CEG/CEV Environmental Management Division and the Air Force Center for Engineering and the Environment (AFCEE) are pleased to provide you with the subject document, including the Finding of No Significant Impact, for your review. The draft EA/OEA has been prepared in accordance with the *National Environmental Policy Act* to analyze the potential environmental consequences of the proposed action.

The proposed actions on lands administered by Hill AFB on the Utah Test and Training Range (UTTR) in Box Elder and Tooele Counties, Utah include test flights and drone launches. Test flight activities would include support aircraft flights and air-to-air missile tests. Approximately 210 F-35 sorties would be flown in UTTR airspace and approximately five drones would be launched and five air-to-air live missile shots would occur. The drones would be launched from and recovered at the UTTR. Operations would occur within existing airspace and would adhere to all existing restrictions and operating procedures established for these activities.

Significant to note on this proposed undertaking is that there will be no construction or modification to facilities on the UTTR. Similar fighter aircraft, such as the F-16 and F-22 have operated on the UTTR for a number of years. Overall UTTR activity would not be expected to change significantly under the proposed action. Therefore, the proposed actions would not result in a significant change to conditions that would affect cultural resources or traditional cultural properties on the UTTR.

In order to provide adequate time for your review and submission of comments regarding this EA/OEA, we request that your comments be received by our archaeologist, Ms. Jaynie Hirschi, 75 CEG/CEVOR, by 19 September 2009. Comments can be submitted by e-mail, [jaynie.hirschi@hill.af.mil](mailto:jaynie.hirschi@hill.af.mil) or at the following address:

Ms. Jaynie Hirschi  
75 CEG/CEVOR  
7274 Wardleigh Rd  
Hill AFB, UT 84056-5137

Hill AFB 75 CEG/CEV and AFCEE sincerely appreciate your support and look forward to receiving and consulting on any comments you may submit regarding this EA/OEA. Additionally, please feel free to contact Ms. Hirschi at (801) 775-6920 or at the above e-mail address.

Sincerely



ROBERT T. ELLIOTT, P.E., YF-02, DAF  
Chief, Environmental Management Division  
75th Civil Engineer Group

Attachment:

CD, Draft *Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter Initial Operational Testing and Evaluation*

cc:

Mr. Harvey Spoonhunter, Northern Arapaho Tribe Co-Chairperson, w/o a  
Ms. Jo Ann White, Northern Arapaho Tribe Tribal Historic Preservation Officer

DISTRIBUTION:

Blackfeet Tribe  
Confederated Tribes of the Goshute Indian Reservation  
Crow Tribe of Montana  
Eastern Shoshone Tribe  
Hopi Tribe  
Navajo Nation  
Northern Arapaho Tribe  
Northwestern Band of the Shoshone Nation  
Paiute Indian Tribe of Utah  
Pueblo of Zuni  
San Juan Southern Paiute Tribe  
Shoshone-Bannock Tribes of the Fort Hall Reservation  
Shoshone-Paiute Tribes of the Duck Valley Reservation

Skull Valley Band of Goshute Indians  
Te-Moak Tribe of Western Shoshone Indians  
Ute Indian Tribe  
Ute Mountain Ute Tribe





**CONSOLIDATED GROUP OF TRIBES AND  
ORGANIZATIONS’  
DOCUMENT REVIEW COMMITTEE’S ASSESSMENT  
OF THE  
DEPARTMENT OF THE AIR FORCE  
DRAFT ENVIRONMENTAL ASSESSMENT/  
OVERSEAS ENVIRONMENTAL ASSESSMENT  
FOR THE  
JOINT F-35 JOINT STRIKE FIGHTER  
INITIAL OPERATIONAL TEST AND EVALUATION**

**SEPTEMBER 2009**

## INTRODUCTION

In 1996, the Consolidated Group of Tribes and Organizations (CGTO) American Indian Writers Subgroup began participating in formal reviews and writing in an Environmental Impact Statement for the U.S. Department of Energy in their Site-wide Environmental Impact Statement. This achievement was followed by the Nellis Air Force Base who incorporated tribal perspectives in their Legislative Environmental Impact Statement for Range Renewal (1999). As a result of this dynamic approach, in 1999, the Nellis Air Force Base elicited the assistance of the CGTO's who appointed a Document Review Committee (DRC) comprised of individuals who would develop and review the NAFB Cultural Resources Management Plan, Cultural Resources Reports, and Environmental Assessments. The following describes the process to select DRC members and their evaluation criteria.

**Document Review Committee Selection Process.** Committee members include 4 tribal representatives from Southern Paiute, Western Shoshone, Owens Valley Paiute and Mojave tribes with coordination by the NAFB American Indian Program Coordinator, for the Nellis AFB Native American Program, a foundation for government-to-government consultation for 17 tribes with demonstrated ancestral ties to NAFB lands (Native American Tribes Map). Since 1996, NAFB has hosted an Annual Native American Meeting to summarize all archaeological, geological, and Native American activities for each year. Each tribe appoints two representatives, and they and the tribal chairperson participate in continual NAFB functions. At every Annual Meeting, the appointed representatives and tribal chairpersons meet in a closed session to submit recommendations to NAFB and appoint members to a variety of committees, including the DRC. Its members make commitments to review and discuss with tribal members documents sent by NAFB. Since 1999, this approach to efficiently and thoroughly review NAFB documents for the tribes has been successful. Each document submitted by NAFB has been reviewed within a 30-day timeframe with written, constructive comments. This effort became the foundation for expanding the systematic consultation model with Native Americans while concurrently allowing the Air Force to fulfill its mission. Integral to this approach is the DRC's consideration and expression that all

areas and resources important and/or sensitive to Indian people must be considered and evaluated by themselves for presentation to the Air Force.

**Evaluation Criteria.** The criterion used by the DRC consists of five distinct areas of consideration to provide uniformity in developing collective responses. The first consideration is the nature of the document and when dealing with specific projects consideration is focused on the Area of Potential Effect and the resources located within close proximity that may be inadvertently disturbed. The second consideration is the impact(s) to cultural resources including historic and/or religious sites. The third area of evaluation is the systematic examination of the archaeological and anthropological records used as a basis of their findings. The fourth consideration is any corresponding survey findings that may be used to potentially clear the area of any important cultural resources. The last important aspect is the appropriateness and justification of the proposed undertaking. As a result of the efforts of the CGTO and the DRC, the Air Force have recognized the important contributions of the group and dedicated a large percentage of its Cultural Resources Management Program funding to support its Native Program budget and the efforts of the DRC.

**JSF EA Review Process.** In August 2009, the U.S. Department of Defense–Nellis Air Force Base notified the Spokesperson of the Consolidated Group of Tribes and Organizations and Coordinator of the Document Review Committee (DRC) about an impending review of an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the F-35 Joint Strike Fighter Initial Operational Test and Evaluation.

In order to expedite the review of the draft EA/OEA, an advance copy was provided to the DRC Coordinator for a cursory review followed by the distribution to the 4 member committee. The responsibility of each member is to agree to the terms of the review and provide a thorough evaluation of the documents within an established timeframe. The review time established for this document was expedited due to the need for the proposed action and was afforded 10 days from receipt of the report to review the document.

## **PROJECT DESCRIPTION**

This report is intended to provide a synthesis of information on behalf of the CGTO's Document Review Committee as it relates to the EA/OEA which analyzes the implementation of the F-35 Joint Strike Fighter Initial Operational Test and Evaluation developed by the Department of the Air Force. The intent of the project is to base twenty (20) F-35s at various military locations in California, Utah, Arizona and in Nevada which includes the Nevada Test and Training Range.

The proposed action also includes several deployment demonstrations sites which would occur at other military locations in Michigan, California, Florida, Wisconsin and aircraft carriers operating in the Point Mugu Ranges in California. Planned activities relating to the operational test and evaluation are planned to occur during a 2-year period commencing in 2012 and concluding in 2014. Although the DRC previously reviewed and commented separately on an Environmental Impact Statement (EIS) associated with the F-35 Aircraft Force Development and Evaluation and Weapons School Beddown at Nellis Air Force Base, the planned activities described in the current document would ultimately overlap. Although the majority of sites under consideration are within the CGTO's Region of Influence, the focus of this report is limited to those activities planned for the NTTR.

## **FINDINGS**

Using the review criteria adopted by the DRC, comments were developed for inclusion into this report and consideration by the Department of the Air Force prior to finalizing any decisions relating to the proposed activities. Contained within this review are specific comments corresponding to each of the areas identified by the DRC that have been provided a section number where appropriate. All responses attempt to provide suggestions and/or comments that provide further insight from a cultural perspective.

**List of Acronyms and Abbreviations** – Currently, there is no listing which identifies the Nellis American Indian Program (NAIP) as previously identified in the EIS associated with the same aircraft mentioned in the F-35 Aircraft Force Development and Evaluation and Weapons School Beddown EIS.

**DRC Comment:** Provisions should be made to include this reference to maintain consistency among other documents relating to the same aircraft and the associated location. Since the Nellis NAIP is the conduit for the CGTO and DRC to interact with the NAFB through documents reviews such as was done for this report, efforts should be made to identify reviewers of this document so parity is maintained.

## **1.0 Purpose and Need for the Proposed Action**

**1.3 Location of the Proposed Action** - The text indicates the Nevada Test and Training Range (NTTR) would be a candidate site for Preferred Test Range (airspace only) for Training and Proficiency Flights in addition to Flight Testing.

**DRC Comment:** It is understood that the NTTR is under consideration for the proposed action and planned activities as it relates to airspace only. However, it is difficult to evaluate impacts without having additional information about what specific region within the NTTR will be used. It is important to obtain this information since the NTTR comprises approximately 3.1 million acres.

## **Description of the Proposed Action and Alternatives**

**2.2.2.2 Test Range Activity** – The text indicates that only airspace would be used for IOT&E activities with the exception of a small number of targets launches and weapons impacts that would occur at established target areas within a particular range. As indicated on Table 2.2.3 beyond Training and Proficiency Flights on the NTTR, support aircraft and weapons release are also being considered.

**DRC Comment:** The text is correct in stating only airspace will be used for IOT&E activities with the exception of a small number of targets launches and weapons impacts not mentioned but include air-to-ground weapon releases, aerial target launches and air-to-air live missile shots. The text should be expanded to provide clarification about this information and proposed activities, so clarity is maintained.

**2.2.3.5 Nevada Test and Training Range** – The text identifies 1050 sorties totaling 1,170 flights during the 2-year duration of the proposed project. It is stated that flights would originate and terminate at Edwards AFB but fly a projected total of 620 flight hours over the NTTR.

**DRC Comment:** Although a total of 1050 sorties are proposed over NTTR, an additional total of 580 support aircraft sorties flying 1070 hours or 20 hours above what is identified in the text. The disparity in additional hours is not adequately explained and is confusing. The text should be modified to provide more clarification.

Other aircraft related to the sorties include fighters and “attack”, bombers, tankers, reconnaissance and surveillance, helicopters and UAVs. Test activities will include three missions that include the releases on inert weapons. While it is understood that detailed information may not be available, the DRC remains concerned about the potential for inadvertent disturbance to significant cultural resource sites on the NTTR.

**Figure 2.2.4 Map of Nevada Test and Training Range** – The maps provides illustrations of the NTTR and MOA with select locations surrounding the area.

**DRC Comment:** Although the map illustrates various communities adjacent to the NTTR MOA, it does not identify various tribal lands including the Timbisha Tribal Homelands, Duckwater Shoshone Tribe, Moapa Paiute Tribe and the Las Vegas Paiute Tribe.

**General Comment** – The map should be modified to illustrate the various tribal lands within close proximity to the MOAs as part of the trust responsibility of the U.S. Government and the Air Force’s continued commitment to recognize and consider the effects associated with military activities on those tribal lands near or within the MOA.

### **3.0 Affected Environment**

**3.1.2.4 Nevada Test and Training Range** – The text provides a brief overview and description of location and activities occurring on the NTTR. In reviewing this section, there is no reference describing the acreage within the NTTR boundaries.

**DRC Comment:** No information is provided describing acreage as in other locations under consideration within this section. The text should be expanded and use the same format for other sites to insure parity, completeness and understanding of the information presented.

### **3.2 Air Quality**

**Existing Air Quality Conditions** – The text provides some information relating to air quality but omits the cultural perspective that was shared with in the 1996 NAFB LEIS.

**DRC Comment:** In the 1996 NAFB Legislative EIS, the CGTO shared information and presented text regarding *Dead Air*, a cultural anomaly or the perceived risks associated with sonic booms and other military activities. It is recommended that consideration be given with proper reference to the previous text developed by the CGTO and specific to NTTR.

### **3.3 Noise**



**3.3.2.4 Nevada Test and Training Range** – The text provides descriptions and number of subsonic and supersonic activities and states the day/night noise level (DNL) in all airspace is within normally acceptable land use compatibility guidelines.

**DRC Comment:** The text does not include any data in the NTTR section relating to estimated DNL noise exposures as is provided in other site locations. The text should be expanded to resemble the same format used in other site descriptions to insure parity, completeness and understanding of the information presented.

### **3.4 Biological Resources**

#### **3.4.2.4 Nevada Test and Training Range**

**Vegetation** – The text provides an overview of some plant communities which are found in the Mojave Desert and Great Basin area.

**DRC Comment:** The text is based on limited information and focuses on only Threatened and Endangered species. It does not include plants identified during ethobotanical studies conducted in the area. Accordingly, tribal representatives identified 364 use plants currently used for foods, medicines and ceremonial use. While some plants may be more abundant than others, Indian people feel that these plants are extremely sensitive and should be protected. Further, plant summaries were included as part of the NAFB 1996 LEIS and should be referenced and included in this document.

**Wildlife** - The text provides an overview of some animals which are found in the Mojave Desert and Great Basin area.

**DRC Comment:** The text is based on limited information and focuses only on Threatened and Endangered species. It does not include animals identified through ethnographic studies conducted in the area. Accordingly, tribal representatives identified an extensive number of animals that are found on the NTTR. While some animals may be more abundant than others, Indian people feel animals are extremely sensitive and

should be protected. Further, animal summaries identified by Indian people were included as part of the NAFB 1996 LEIS and should be referenced and included in this document.

Lastly, the DRC is aware of several sensitive habitats and seasonal use areas for various animals species found on the NTTR that were inadvertently omitted in the descriptions provided. A culturally known and important “birthing” area for bighorn sheep is located in the North Ranges of the NTTR while similar areas used by the Desert Tortoise are found in the southern portions of the NTTR. Throughout the NTTR, are numerous migration trails used by various animal species. Great care must be given to these areas so as not to inadvertently disrupt regularly scheduled reproduction and sensitive habitats. Other sensitive areas and/or habitats located nearby include the Desert Wildlife and Pahranaagat National Refuges which enjoy adjoining boundaries to the NTTR with no fences. Both locations contain sensitive species including numerous raptors such as the Bald Eagle which was inadvertently omitted.

### **3.5 Environmental Justice**

The text provides an overview and interpretation of Executive Order 12898 *Environmental Justice* and its application to NEPA. Contained in the same section is a reference to Demographic Analysis where no data is presented to support any conclusions.

**DRC Comment:** Air Force must ensure that this document was developed in accordance with NEPA. As such, NEPA identifies that each federal agency should analyze the environmental effects, including human health, social effects of federal action, including effects on minority populations, low income populations and Indian Tribes, when such analysis is required by NEPA.

Further, mitigation measures identifies as part of an Environmental Assessment should whenever feasible, address significant and adverse environmental effects of populations on minority populations, low income populations and Indian Tribes.

Each federal agency must provide opportunities for effective community participation in the NEPA process including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings, crucial documents and meetings.

Executive Order 12898 Federal Action to Address Environmental Justice in Minority Populations and Low income Populations provides that each federal agency shall make achieving Environmental Justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations . This Order makes its clear that its provision applies full to programs involving American Indians.

Previously, the DRC presented text in the NAFB LEIS which included a discussion of Environmental Justice and the disproportionate impacts to American Indian communities who have cultural affiliation with the NTTR. Some pointed examples include holyland and access violations creating a disconnect in the perpetuation of religious ceremonies guaranteed under the American Indian Religious Freedom Act and Executive Order 13007 Access to Sacred Sites. No other group of people has experienced these types of obstacles.

Moreover, culturally affiliated Indian tribes are now experiencing a disproportionate amount of impacts relating to this project which is centered within the aboriginal lands of the Southern Paiute, Western Shoshone, Owens Valley Paiute and Mojave people. Clearly, there is the perception that this project is intentionally being proposed within the western portion of the United States and within the Consolidated Group of Tribes and Organizations' Regional of Influence.

In order to fully understand the implications of Environmental Justice, the text should be expanded to include the information presented by the DRC both currently and previously. Additionally, supporting data should be included within the body of the EA address these issues to insure completeness of the information presented for analysis.

## **4.0 Environmental Consequences**

### **4.2 Proposed Action**

**4.2.2 Noise** - The text describes human response to changes in noise levels and its dependence on many factors including: quality of sound, the magnitude of the change, the time of day at which the changes take place, whether the noise is continuous or intermittent, and the individual's ability to perceive the changes. Moreover, it states: human ability to perceive changes in noise levels varies widely with the individual.

**DRC Comment:** The real and perceived changes in noise levels are based on information that does not coincide with American Indian epistemology. The data contained on Table 4.2.9 attempts to provide a comparative analysis of the average dBA using different types of aircraft flown on the NTTR. The DRC is aware that many of the geologic features within the NTTR have unique acoustical properties that further amplify sounds thus increasing the dBAs which is not considered nor presented.

The existing text suggests that most animals have acclimated to the increase noise levels and according to research conducted by the Air Force in 1999 on Desert Tortoise, the same findings were confirmed. The DRC questions these findings and recognizes that while some adaptations may have occurred, not all are understood. Many animals including the Desert Tortoise have religious overtones that are not included in the analysis. Like humans, animals respond to changes in noise levels depend on many factors including: quality of sound, the magnitude of the change, the time of day at which

the changes take place, whether the noise is continuous or intermittent making the animal skittish anticipating unexpected changes. Moreover, human ability to perceive changes in noise levels varies widely with the individual as it does in individual animals.

The dBAs appear only to focus on sound emitted from overflights including subsonic and supersonic aircraft. The analysis does not appear to include the noise generated air-to-ground weapon releases, aerial target launches and air-to-air live missile shots that have implications to animals, their habitats and other important cultural resources. Therefore, based on these perceptions, the DRC recommends the Air Force conduct expanded studies using acoustical differences deriving from geological features to compensate for this disparity and adequately address the impacts to both humans and animals.

#### **4.3 Unavoidable Adverse Environmental Effects**

The text concludes with the perception that the proposed action would not result in short- or long- term significant impacts to socio-economics, airspace, land use, aesthetics, transportation, utilities, hazardous materials management, geology and soils, water resources or cultural resources. The resources analyzed in more detail are air, noise, biological resources and environmental justice.

**DRC Comment:** Since there is no evidence or data from systematic studies to support no short-or long-term significant impacts within these areas, it is difficult to concur with the conclusion. Upon examining this document in its entirety, there is no empirical data to conclude there will be no impacts to socioeconomic or cultural landscapes. Equally, there is an absence of ethnographic information that indicates the current land use and contains descriptions of the culturally perceived desert aesthetic. Further, no culturally-based studies evaluating actual or perceived impacts to water, biological and cultural resources have been conducted leaving these topical areas incomplete and misunderstood. Only 4 resource areas were considered resulting in an incomplete opinion and analysis.

Upon further examination, no consideration is given to bird/wildlife aircraft strike hazards, especially those identified as Class B or C Mishaps. This information is useful and consistent with other documents relating to the F-35 Strike Fighter.

## **5.0 Consultation and Coordination**

A listing of State and Federal Agencies are identified that were a party to receiving and commenting on this draft document.

**DRC Comment:** The table omits tribal governments and Tribal Historic Preservation Offices which has similar standing to State Historic Preservation Offices. This oversight should be corrected and appropriately identified in this Table.

## **SUMMARY REMARKS**

The DRC has thoroughly evaluated the Draft Environmental Assessment/Overseas Environmental Assessment for the F-35 Strike Fighter Initial Operation and Evaluation developed for the Department of Air Force. The report appears to describe the proposed action with corresponding tables and appendices with some need for clarification or expanded text as identified in the DRC comments. While the DRC does not support the destruction of important resources, it recognizes that the purpose of this Environmental Assessment is required under the National Environmental Policy Act and supports the mission of the Department of Defense, Nellis Air Force Base and the F-35 Joint Strike Force activities proposed for the Nevada Test and Training Range.

The DRC has identified fifteen (15) comments and seven (7) recommendations to further enhance the Draft Environmental Assessment prior to finalizing the report and making a final determination. The document described in this review is considered necessary for military operations. Using the criteria established the DRC; the committee was afforded the opportunity to collectively and systematically evaluate the document. Most

importantly, as a consortium of tribes, the CGTO has worked collaboratively with the NAFB since 1996 to effectively co-manage the resources on the Nellis Air Force Base and the Nevada Test and Training Range to achieve its mission in a mutually compatible manner. .

## **RECOMMENDATIONS**

1. The DRC recommends that more collaboration be initiated between all federal agencies having responsibility to manage lands under their jurisdiction and that have a trust responsibility to work directly with culturally affiliated tribal governments.
2. The DRC recommends that the Consolidated Group of Tribes and Organizations accept the basis of this report with the understanding that the results of the DRC's findings be incorporated into a final report.
3. The DRC recommends the Draft Environmental Assessment/Overseas Environmental Assessment for the F-35 Strike Fighter Initial Operation and Evaluation developed for the Department of Air Force be revised to include those recommendations and/or suggestions identified by the DRC prior to being finalized and accepted.
4. The DRC recommends that systematic studies be conducted to evaluate the impacts of sonic booms and associated impacts deriving from the proposed project as a means of ascertaining the impacts to culturally sensitive areas using systematic ethnographic data useful in future military activities.
5. The DRC commends the NAFB for recognizing the importance of incorporating systematic reviews of proposed actions and continues to recommend that all future efforts be coordinated through Richard Arnold, CGTO Spokesperson and Program Coordinator.

6. The DRC recommends their review of this report does not diminish the need for continued consultation and evaluation of areas of importance to Native Americans that may occur in or near the proposed project area described in this report.
7. The DRC recommends that all documents describing and/or having possible cultural implications continue to be systematically evaluated by the DRC.





**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
<b>REGULATORY CONSULTATION COMMENTS</b>		
<b>USFWS Green Bay comments</b>		
1	Based upon the information provided for our review, the Service anticipates there will be no significant adverse effects to federally-listed species.	Comment noted.
<b>USFWS Michigan comments</b>		
1	Our records do not indicate the presence of listed or proposed species or critical habitat near your proposed project. This precludes the need for further action on this project as required by the Endangered Species Act of 1973, as amended. If the project is modified or new information about the project becomes available that indicates listed species or critical habitat may be affected in a manner or to an extent not previously considered, you should reinitiate consultation with this office.	Comment noted.
<b>USFWS Utah comments</b>		
1	Please add the fat-whorled pond snail ( <i>Stagnicola bonnevillensis</i> ), a candidate species, and the California condor ( <i>Gymnogyps californianus</i> ), an endangered species, to Table 1. The fat-whorled pond snail is found in Box Elder County and the California condor has an experimental, non-essential population in Millard County.	The comment refers to Table 1 in an attachment to a letter to the Utah USFWS. Table 1 lists species for the Utah counties where JSF IOT&E activities at UTTR would occur. The comment is applicable to Table 3.4-4 in the EA/OEA. These species have been added to Table 3.4-4.
2	Activities from the NTTR will extend into airspace over Washington and Iron Counties, Utah. Table 2 in your letter lists federally listed species that occur in these two counties. Three species should be deleted from this list: Columbia spotted frog, relict leopard frog, and Yuma clapper rail. The Columbia spotted frog ( <i>Rana luteiventris</i> ) is not a candidate for listing in Utah.... The relict leopard frog ( <i>Rana onca</i> ), although a candidate species, is not currently found in Utah. Populations in Utah appear to have been extinct since the 1950s. The Yuma clapper rail ( <i>Rallus longirostris yumaensis</i> ) is not found in Utah; current populations only occur in Arizona. Please delete these species from Table 2.	The comment refers to Table 2 in an attachment to a letter to the Utah USFWS. Table 2 lists species for the Utah counties where JSF IOT&E activities at NTTR would occur. The comment is applicable to Table 3.4-3 in the EA/OEA. However, Table 3.4-3 consists of species listed for counties in both Utah and Nevada where JSF IOT&E activities at NTTR would occur. This comment only applies to Utah counties. Because these species are listed for the affected counties in Nevada, they have been retained in Table 3.4-3.
3	Because the proposed action will adhere to all existing range restrictions and overall range activity would not be expected to change significantly, we agree that the proposed action would not constitute new impacts to wildlife.	Comment noted.
4	...our office would like to review the specific range restrictions for UTTR and NTTR using the most current scientific information and determine if they remain sufficient to minimize wildlife impacts. We also request a copy of the results from the research conducted by the U.S. Air Force on jet noise impacts to desert tortoise mentioned in your letter.	Comment noted. A copy of the document was sent to the USFWS office in Utah.

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
5	An additional potential biological resource impact is the ability of ground operations at UTTR (five air-to-air live missile shots) to impact water quality of nearby water bodies. Our office would like additional details that demonstrate that no missile remnants, chemical or physical, would enter an open water body in the Great Basin.	Comment noted. A copy of the requested information was sent to the USFWS office in Utah.
<b>USFWS, Ventura comments</b>		
1	Based on our knowledge of the species that are likely to occur in the action area and the nature of the proposed action, we concur that disturbance associated with noise and visual exposure would be the only potential adverse effects.	Comment noted.
2	In the enclosed lists, we have omitted species from the lists you provided us that do not occur in the area under consideration, are no longer listed, or not the responsibility of the Fish and Wildlife Service. We have included species that are likely to be present that were not on the lists you provided.	Tables 3.4-1, 3.4-2, and 3.4-9 have been revised in accordance with the lists provided by USFWS Ventura.
<b>Arizona State Historic Preservation Office comments</b>		
1	No Historic Properties Affected – Contingent upon no tribal concerns	Comment noted.
<b>California State Historic Preservation Office comments</b>		
1	...in accordance with 36 CFR 800.5(b), I can concur with a finding of No Adverse Effect for this undertaking.	Comment noted.
<b>Florida State Historic Preservation Office comments</b>		
1	Based on the information provided, it is the opinion of this office that the [F-35 JSF IOT&E] undertaking will have no effect on historic properties.	Comment noted.
<b>Nevada State Historic Preservation Office comments</b>		
1	The SHPO concurs with the U.S. Air Force's determination that the proposed undertaking will not pose an effect to historic properties.	Comment noted
<b>New Mexico State Historic Preservation Office comments</b>		
1	We have no comments at this time.	Comment noted
<b>Utah State Historic Preservation Office comments</b>		
1	From the information you provided, it appears that no cultural resources were located in the project Area of Potential Effects. We concur with your determination of No Historic Properties Affected for this project.	Comment noted
<b>Wisconsin State Historic Preservation Office comments</b>		
1	We believe the program, as currently proposed, will have no effect on historic properties located within the area of potential effect of the proposed undertaking.	Comment noted

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
<b>COMMENTS TO THE DRAFT ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT</b>		
<b>New Mexico Environment Department comments</b>		
1	The project as proposed should have no long term significant impacts to ambient air quality.	Comment noted.
<b>California State Clearing House and Planning Unit comments</b>		
1	The review period closed on July 22, 2009, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.	Comment noted.
<b>USFWS Nevada comments</b>		
1	We are concerned that the proposed project would impact the federally listed as threatened desert tortoise ( <i>Gopherus agassizii</i> ) (Mojave population) and its habitat. Habitat loss and degradation are major threats to the recovery of this species. As you are aware, the Service issued, under section 7 of the Act, a programmatic biological opinion (BO) for training activities at NTTR. We recommend that you review this programmatic BO to ensure the proposed activities can be appended to the programmatic BO. Although the proposed project may be covered under the programmatic BO, under NEPA the final EA should disclose project impacts to the desert tortoise and its habitat, and provide avoidance and minimization measures for impacts to desert tortoise as appropriate.	The only JSF IOT&E activity that could potentially affect desert tortoise habitat at NTTR is the air-to-ground release of 3 inert weapons. This would occur at existing, established targets on the NTTR. In 1995, 1,944 inert targets were released on the NTTR. The 3 releases that would occur as part of the proposed action would be a minimal percentage of total weapons currently being released on the range. The weapons releases proposed as part of JSF IOT&E would not be any different from the current ongoing weapons releases conducted at NTTR. Air-to-ground releases are a long-term training activity conducted at NTTR. As part of this ongoing activity, they would be conducted in accordance with conditions of the programmatic biological opinion for the desert tortoise. The 1999 Renewal of the Nellis Air Force Range Land Withdrawal Legislative EIS (LEIS) analyzed ongoing range activities and stated that adverse impacts to the tortoise and its habitat would occur on a limited portion of the South Range that is used for air-to-ground weapons training. However, it concluded that impacts to desert tortoises would be insignificant. The weapons releases that would occur as part of JSF IOT&E are part of ongoing range activities that were addressed and analyzed in the LEIS. The text in Section 4.2.3.2.4 has been expanded to include the additional clarification provided in this response.



**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
2	<p>The Service also has conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 <i>et seq.</i>). Projects should be evaluated for potential impacts to migratory birds in the area. Under the MBTA, nests (nests with eggs or young) of migratory birds may not be harmed, not may migratory birds be killed. Such destruction may be in violation of the MBTA. Therefore, we recommend any surface disturbance associated with proposed activities, be conducted outside the avian breeding season to avoid potential destruction of bird nests or young, or birds that breed in the area. If this is not feasible, we recommend a qualified biologist survey the area prior to any surface disturbance. If nests are located, or if other evidence of nesting (<i>i.e.</i>, mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the area avoided to prevent destruction or disturbance to nests until they are no longer active.</p>	<p>As stated in the response to the previous comment, surface disturbance would be limited to 3 air-to-ground releases of inert weapons at existing, established targets. Inert weapons releases are long-term, ongoing activities at NTTR. All existing procedures in place for the protection of natural resources on the NTTR for weapons releases and use of target sites would be adhered to for JSF IOT&amp;E activities.</p>
3	<p>We are concerned about project impacts to the banded Gila monster (<i>Heloderma suspectum cinctum</i>), a species protected under the Nevada Administrative Code 503.080 and listed as sensitive by the Nevada Natural Heritage Program (Heritage Program). The banded Gila monster occurs primarily in the Mojave Desert scrub and salt desert scrub ecosystems in southern Nevada, southeastern California, southwestern Utah, and western Arizona. The banded Gila monster is one of only two venomous lizard species in the world. Gila monsters are difficult to locate as they spend the majority of the year in underground burrows; however, illegal collection, construction of roads, and loss of habitat continue to threaten this sensitive species. Given that the Gila monster is known to occur within the geographic area, we recommend that you evaluate project impacts to any existing populations and suitable habitat for this species in the final EA. If it is determined that the project may result in impacts to Gila monsters, we suggest that you contact the Nevada Department of Wildlife to minimize and mitigate impacts to this species as appropriate.</p>	<p>As stated in the responses to the previous comments, surface disturbance would be limited to 3 air-to-ground releases of inert weapons at existing, established targets. The specific target sites that would be used have not been identified; therefore, a site-specific analysis by target site cannot be conducted. However, inert weapons releases are long-term, ongoing activities at NTTR. All existing procedures in place for the protection of natural resources on the NTTR for weapons releases and use of target sites would be adhered to for JSF IOT&amp;E activities.</p>

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
4	We are concerned about potential project impacts to the Clokey eggvetch ( <i>Astragalus oophorus</i> var. <i>clokeyanus</i> ), a species considered rare under the Heritage Program. Two of the 23 known Clokey eggvetch populations occur within the Belted Range and in the vicinity of the Cliff Springs target complex in the NTTR. Because populations are typically small in number and area, the Clokey eggvetch is highly vulnerable to human disturbance and stochastic events including drought, fire, flooding and invasion by nonnative species. Populations in the Spring Mountains, the only other known location for the species, have been impacted by disturbance from recreation and other uses. The final EA should include an analysis of possible direct and indirect impacts to this rare species as a result of implementation of the proposed project. We ask that you include in the final EA, measures to avoid potential impacts to Clokey eggvetch populations as appropriate.	As stated in the responses to the previous comments, surface disturbance would be limited to 3 air-to-ground releases of inert weapons at existing, established targets. The specific target sites that would be used have not been identified; therefore, a site-specific analysis by target site cannot be conducted. However, inert weapons releases are long-term, ongoing activities at NTTR. All existing procedures in place for the protection of natural resources on the NTTR for weapons releases and use of target sites would be adhered to for JSF IOT&E activities.
5	We are also concerned about potential project impacts to cliff needlegrass ( <i>Stipa shoshoneana</i> ), a species listed on the Heritage Program's watch list. Species listed under the Heritage Program's watch list are species that could be declining in Nevada or across a large portion of their range and/or less common that currently thought and, as a result, could become at-risk in the future. We recommend that the final EA disclose possible impacts to cliff needlegrass as a result of implementation of the proposed project. We ask that you include in the final EA measures to avoid, minimize or offset potential impacts to this species as appropriate.	As stated in the responses to the previous comments, surface disturbance would be limited to 3 air-to-ground releases of inert weapons at existing, established targets. The specific target sites that would be used have not been identified; therefore, a site-specific analysis by target site cannot be conducted. However, inert weapons releases are long-term, ongoing activities at NTTR. All existing procedures in place for the protection of natural resources on the NTTR for weapons releases and use of target sites would be adhered to for JSF IOT&E activities.
<b>Bill Gries, Edwards AFB Airspace Manager, comments</b>		
1	General Comment: The term "R-2508 Complex" is used throughout the document to refer to Edwards AFB when this term is used to define the airspace consisting of Restricted Areas, MOAs and ATCAAs. Suggest a search and replace be used...just one example Table 4.2-4...this should read Edwards AFB not R-2508 Complex. Care needs to be taken since page 4-14 line 24 is stated correctly.	In this document, Edwards AFB is used to describe the installation which is where activities associated with basing the F-35 aircraft and F-35 takeoffs and landings would occur, while R2508 Complex refers to the test range airspace area where F-35 flight activity would occur. The use of the terms in Table 4.2-4 is consistent with this approach.
2	Page 1 Line 31-34...Although stating noise levels are comparable to current airframes but "would slightly increase" is inserted. Would this require a new AICUZ?	A new AICUZ is not required unless the annual noise level increases by more than DNL 2 dBA. Short-term duration of deployment demonstrations would not have enough impact to affect the AICUZ which is based on an annual noise level, not short-term.
3	Page 1-7 lines 2 and 7...remove parenthesis and airspace after Edwards AFB	The text had been revised to remove the "(Edwards AFB airspace)" after 'R-2508 Complex' in order be consistent with how these are treated as separate locations in this document.

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
4	Page 2-7 line 9...states "would primarily use military operations areas (MOAs)". This means flight operations will NOT go about FL180. Suggest inserting after "(MOAs)" "and associated Air Traffic Control Assigned Airspace (ATCAAs)". ATCAAs associated with the MOAs within the R2508 complex would then allow flight to FL600. Then immediately after this sentence insert "These MOAs/ATCAAs are the..." You would have to check to see if Nellis and Mugu have ATCAAs.	The text has been revised in accordance with the comment.
5	Page 2-7 line 36...suggest adding after military "Special Use Airspace (SUA)" and deleting "use airspace"	Special Use Airspace is a subset of military use airspace. The text is not incorrect as is and has not been revised.
6	Page 2-11 lines 27 thru 31 replace with: "Edwards AFB is surrounded by the R-2508 Complex which includes all the internal restricted areas, MOAs and associated ATCAAs (Figure 2.2-2). These areas would be used for test range activities including both pilot training, proficiency flights and test flights. Table 2.2-5 provides a summary of the JSF IOT&E activities proposed for the R-2508 Complex."	The text has been revised to reflect the comment. The text has also been clarified to explain that in this analysis, the term R-2508 Complex does not include the entire complex, but excludes airspace specifically associated with NAWCWD China Lake and NTC Fort Irwin, as these are considered separate locations for IOT&E activities.
7	Page 2-12 Figure 2.2-2...Suggest replacing this figure with one which also depicts the MOAs. The bold print lower right side should use the term "Special" instead of "Associated" and eliminate the word "California" since the state's name is clearly visible on the map. Case in point for inserting the other MOA names...Porterville, Shoshone and the other external MOAs and shown but not the internal ones such as saline Owens etc.	Figure 2.2-2 has been revised to include the internal MOAs. The other requested changes have not been made in order to keep the figure title consistent with the other figures in this document.
8	Page 2-13 line 2-3...replace "in the R-2508 and R-2515 airspaces at Edwards AFB." with "within the R-2508 Complex surrounding Edwards AFB." This then takes into account all the internal restricted areas and associated MOAs/ATCAAs.	The text has been revised to simply refer to the R-2508 Complex as it is defined for use in this document, rather than to the "R-2508 and R-2515 airspaces at Edwards AFB."
9	Page 2-15 line 3 and 4, page 2-17 line 22-23: Thought the pilot training and proficiency flights were to occur at Edwards while the other ranges would be test flights.	Pilot training and proficiency flights would occur in three areas. The text in sections 1.7 and 2.2.2.2 states that this activity would occur at R-2508 Complex, NAWCWD Point Mugu Sea Range, and NTTR.
10	Comment for "Pilot Training and Proficiency Flights" page 2-11 states these flights will occur within the R2508 Complex but yet page 2-15 line 15 and page 2-17 line 29 talks to this same area. Suggest renaming these two page topics to " <b>Pilot Sorties</b> ." In table 2.2-5 it states 720 Training/Proficiency sorties for R2508 Complex, Table 2.2-8 same numbers and Table 2.2-10 same numbers. If all Profs and Pilot Training flights will occur at Edwards then eliminate the 720 in each table and insert a zero.	Only a portion of the pilot training and proficiency flights would occur in the R-2508 Complex. Pilot training and proficiency flights would occur in three areas. The text in sections 1.7 and 2.2.2.2 states that this activity would occur at R-2508 Complex, NAWCWD Point Mugu Sea Range, and NTTR. No revision to the text has been made.
11	Page 2-18 Figure 2.2-4...map is incorrect. Reveille MOA is divided into a north and south MOA.	Figure 2.2-4 has been revised in accordance with the comment.

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
12	Page 3-1 lines 44-45...suggest changing "includes restricted areas R-2508 and R-2515 and adjacent MOAs which overlie portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties (see Figure 2.2-2)." to read "includes restricted areas R-2508, R-2502N, R-2502E, R-2505, R-2506, R-2524, R-2515 and associated MOAs and ATCAAs which overlie portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties (see Figure 2.2-2)." This provides a more accurate definition of the R2508 Complex than just the original sentence.	The text has been revised to reflect the comment. The text has also been clarified to explain that in this analysis, the term R-2508 Complex does not include the entire complex, but excludes airspace specifically associated with NAWCWD China Lake and NTC Fort Irwin, as these are considered separate locations for IOT&E activities.
13	Page 3-1 lines 46-49 to page 3-2 line 1...eliminate after "(see Figure 2.2-2)" to "however, because". Then begin a new sentence with "JSF IOT&E" ....	See response to comment 12 above.
14	Page 3-2 lines 4-7 replace with "Management of military aircraft operations in the R-2508 Complex is performed by the R-2508 Joint Policy and Planning Board, which consists of the Commanders at Edwards AFB, NAWCWD and NTC Fort Irwin."	The text has been revised in accordance with the comment.
15	Page 3-2 line 40...2521 should read "2524"	The text has been revised in accordance with the comment.
16	Page 3-2 line 40...question: How is R2506 proposed to be used? The altitude cap is 6000 MSL.	Details on how this specific airspace may be used for JSF IOT&E are not decided at this time.
17	Page 3-3 line 16...change "comprised of airspace" to read "comprised of Special Use Airspace".	The text is not incorrect as is and has not been revised.
18	Page 3-17 lines 16-18...I thought we did have an AICUZ or was it just a noise study?	Edwards AFB does not have an AICUZ. It is exempt from having an AICUZ because the DNL 65-dBA noise contour does not extend beyond the boundaries of the base.
<b>SMSgt David L. Nichols, Acting Environmental Management Officer, Alpena CRTC, comments</b>		
1	I have completely reviewed the Draft EA/OEA for the Joint Strike Fighter IOT&E and have found no significant issues with the document and the conclusions that were made in the document.	Comment noted.
<b>Daniel D. Gonnering, Natural Resource Manager, Volk Field CRTC, comments</b>		
1	Read the copy of the letter to the public but could not find local outlets i.e. news paper, to let the public know the document is available for review.	The notice was published in the Juneau County Star-Times on June 20, 2009.
2	Table 3.4-11 - The grey wolf was delisted March 12, 2007.	The gray wolf population in the western Great Lakes area was relisted in June 2009. The USFWS has concurred that the species list for Juneau County, WI, is current and complete.
<b>Quechan Indian Tribe comments</b>		
1	We have reviewed the draft EA... and understand that the EA is not evaluating the basing of aircraft, only the operational testing and that only existing facilities, runways, etc., will be utilized for the operational testing.	Comment noted.



**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
2	We would like to reiterate previous requests that if there is to be any ground disturbance associated with the construction of facilities or runways for the F-35 or with landing of the aircraft in the desert, that the Tribe be consulted with prior to the POD as there are resources affiliated with the Tribe located in the area.	No such activities are proposed as part of JSF IOT&E activities.
<b>Consolidated Group of Tribes and Organizations comments</b>		
1	Provisions should be made to include this reference [Nellis American Indian Program (NAIP)] to maintain consistency among other documents [F-35 Force Development Evaluation and Weapons School Beddown EIS] relating to the same aircraft and the associated location. Since the Nellis NAIP is the conduit for the CGTO and DRC to interact with the NAFB through documents reviews such as was done for this report, efforts should be made to identify reviewers of this document so parity is maintained.	References to the Nellis American Indian Program have been added to the text in Section 3.4.2.4 and NAIP has been added to the list of acronyms.
2	Section 2.2.2.2 - The text is correct in stating only airspace will be used for IOT&E activities with the exception of a small number of targets launches and weapons impacts not mentioned but include air-to-ground weapon releases, aerial target launches and air-to-air live missile shots. The text should be expanded to provide clarification about this information and proposed activities, so clarity is maintained.	A description of weapons missions is provided later in this section under the discussion of Test Flights. Section 2.2.2.2. refers to two general types of flight activities; training and proficiency flights, and test flights. The text in the introductory paragraph to this section has been revised to clarify that the weapons mission are part of the test flight activity.
3	It is understood that the NTTR is under consideration for the proposed action and planned activities as it relates to airspace only. However, it is difficult to evaluate impacts without having additional information about what specific region within the NTTR will be used. It is important to obtain this information since the NTTR comprises approximately 3.1 million acres.	The JSF IOT&E will utilize all the airspace within the NTTR and adhere to all range restrictions and procedures identified in the Nellis supplement to AFI 13-212. AFI 13-212 Section 9.2 recognizes the applicability of the Sikes Act and other laws and regulations. Consequently compatibility between cultural/natural resource concerns and range use is incorporated into the supplements; the Integrated Cultural Resource Management Plan (ICRMP) and Integrated Natural Resource Management Plan (INRMP) concerns are considered in the identification of avoidance areas. Because the activities proposed for JSF IOT&E would adhere to all range restrictions and procedures and use established airspace and targets, no significant impacts are expected. Use of an established target site or conducting supersonic flight in a corridor already used for supersonic flight would not result in a change to current conditions that would result in a significant impact. .

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
4	<p>Section 2.2.3.5 - Although a total of 1050 sorties are proposed over NTTR, an additional total of 580 support aircraft sorties flying 1070 hours or 20 hours above what is identified in the text. The disparity in additional hours is not adequately explained and is confusing. The text should be modified to provide more clarification.</p> <p>Other aircraft related to the sorties include fighters and "attack", bombers, tankers, reconnaissance and surveillance, helicopters and UAVs. Test activities will include three missions that include the releases on inert weapons. While it is understood that detailed information may not be available, the DRC remains concerned about the potential for inadvertent disturbance to significant cultural resource sites on the NTTR.</p>	<p>The numbers of sorties and flight hours have been corrected for consistency between the text and tables. JSF IOT&amp;E weapons releases would occur only at existing test sites on NTTR where these activities are routine. They would not present a new potential impact to cultural resource sites.</p> <p>All F-35 and support aircraft would be flown in accordance with the existing restrictions (i.e., altitude, speed, time, or avoidance area restrictions) applicable to the NTTR airspace. All releases of stores would occur in established target areas and would be conducted in compliance with all established standard operating procedures. These restrictions and procedures should minimize the potential for disturbing cultural resource sites on the NTTR.</p>
5	<p>Figure 2.2.4- Although the map illustrates various communities adjacent to the NTTR MOA, it does not identify various tribal lands including the Timbisha Tribal Homelands, Duckwater Shoshone Tribe, Moapa Paiute Tribe and the Las Vegas Paiute Tribe.</p> <p>The map should be modified to illustrate the various tribal lands within close proximity to the MOAs as part of the trust responsibility of the U.S. Government and the Air Force's continued commitment to recognize and consider the effects associated with military activities on those tribal lands near or within the MOA.</p>	<p>The figures in Chapter 2 are intended to provide the general geographic location of the various installations proposed for JSF IOT&amp;E activities. Geographic features, such as state boundaries, major roads, and selected communities, are shown on these figures to aid in depicting the geographic extent of the ranges. Various land use areas such as tribal lands, national parks, wildlife refuges, and wilderness areas, are not shown since these do not further the intent of these figures, and the additional detail may detract from their simple purpose of showing the general location and extent of test ranges. Details are provided in this EA/OEA commensurate to the potential for the proposed action to affect specific resources. Because no significant impacts to land uses or environmental justice concerns were identified for JSF IOT&amp;E, details such as tribal lands have not been provided on figures in this document.</p>
6	<p>Section 3.1.2.4 - No information is provided describing acreage [within the NTTR boundaries] as in other locations under consideration within this section. The text should be expanded and use the same format for other sites to insure parity, completeness and understanding of the information presented.</p>	<p>The text in Section 3.1.2.4 has been revised to include information on size of the NTTR.</p>

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
7	<p>Section 3.2 - In the 1996 NAFB Legislative EIS, the CGTO shared information and presented text regarding Dead Air, a cultural anomaly or the perceived risks associated with sonic booms and other military activities. It is recommended that consideration be given with proper reference to the previous text developed by the CGTO and specific to NTTR.</p>	<p>The 1999 LEIS for the renewal of the land withdrawal does mention this concern, but it does not provide an analysis of potential impacts relevant to Dead Air or similar topics for which there are no accepted methods for conducting a scientific analysis. Otherwise, the 1999 LEIS analyzed all issues associated with ongoing and future activities on the NAFR. JSF IOT&amp;E is representative of the types of “future activities” analyzed in the 1999 LEIS and would represent a small portion (0.3% to 3% depending on the number of sortie-operations) of ongoing NAFR activities, consequently no significant changes to Dead Air or similar topics would be expected.</p> <p>This EA/OEA focuses only on those resources with the potential to be significantly impacted by proposed JSF IOT&amp;E activities. Activities specific to JSF IOT&amp;E would not be significantly different from activities currently occurring on the NTTR. Sonic booms are a function of supersonic flight. Aircraft associated with JSF IOT&amp;E activities would fly at supersonic speed only in locations currently authorized and used for supersonic flight. There would be no increase in range activity from JSF activity. Therefore, there would be no significant changes to the existing environment from sonic booms. For this reason, this topic is not addressed on detail in the EA/OEA. Furthermore, because JSF activities would not represent a significant change from current conditions on the NTTR, no significant changes to Dead Air issues would be expected.</p>
8	<p>Section 3.3.2.4 –The text does not include any data in the NTTR section relating to estimated DNL noise exposures as is provided in other site locations. The text should be expanded to resemble the same format used in other site descriptions to insure parity, completeness and understanding of the information presented.</p>	<p>The text in Section 3.3.2.4 has been revised to include information on noise levels on the NTTR.</p>
9	<p>Section 3.4.2.4 -Vegetation –The text is based on limited information and focuses on only Threatened and Endangered species. It does not include plants identified during ethobotanical studies conducted in the area. Accordingly, tribal representatives identified 364 use plants currently used for foods, medicines and ceremonial use. While some plants may be more abundant than others, Indian people feel that these plants are extremely sensitive and should be protected. Further, plant summaries were included as part of the NAFB 1996 LEIS and should be referenced and included in this document</p>	<p>The text has been revised to include mention of the number of plant species currently used for foods, medicines and ceremonial use.</p>

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
10	<p>Section 3.4.2.4 -Wildlife - The text is based on limited information and focuses only on Threatened and Endangered species. It does not include animals identified through ethnographic studies conducted in the area. Accordingly, tribal representatives identified an extensive number of animals that are found on the NTTR. While some animals may be more abundant than others, Indian people feel animals are extremely sensitive and should be protected. Further, animal summaries identified by Indian people were included as part of the NAFB 1996 LEIS and should be referenced and included in this document.</p> <p>Lastly, the DRC is aware of several sensitive habitats and seasonal use areas for various animals species found on the NTTR that were inadvertently omitted in the descriptions provided. A culturally known and important "birthing" area for bighorn sheep is located in the North Ranges of the NTTR while similar areas used by the Desert Tortoise are found in the southern portions of the NTTR. Throughout the NTTR, are numerous migration trails used by various animal species. Great care must be given to these areas so as not to inadvertently disrupt regularly scheduled reproduction and sensitive habitats. Other sensitive areas and/or habitats located nearby include the Desert Wildlife and Pahranaagat National Refuges which enjoy adjoining boundaries to the NTTR with no fences. Both locations contain sensitive species including numerous raptors such as the Bald Eagle which was inadvertently omitted.</p>	<p>The text has been revised to include information included in this comment.</p> <p>The Desert National Wildlife Range, Pahranaagat NWR, bighorn sheep birthing area, and desert tortoise habitat have been added to the discussion in Section 3.4.2.4. JSF IOT&amp;E activities would be conducted in accordance with all existing range procedures for protection of natural resources on NTTR, and no significant impacts are anticipated.</p>
11	<p>Section 3.5 - Air Force must ensure that this document was developed in accordance with NEPA. As such, NEPA identifies that each federal agency should analyze the environmental effects, including human health, social effects of federal action, including effects on minority populations, low income populations and Indian Tribes, when such analysis is required by NEPA.</p> <p>Further, mitigation measures identifies as part of an Environmental Assessment should whenever feasible, address significant and adverse environmental effects of populations on minority populations, low income populations and Indian Tribes.</p> <p>Each federal agency must provide opportunities for effective community participation in the NEPA process including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings, crucial documents and meetings.</p>	<p>The Environmental Justice analysis was conducted in accordance with 32 CFR 989.33 and the methodology prescribed in the USAF Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process.</p> <p>No significant adverse environmental impacts that require mitigation or that could have a disproportionate effect on minority and/or low-income populations were identified. Therefore, a detailed demographic analysis is not warranted.</p>

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
	<p>Executive Order 12898 Federal Action to Address Environmental Justice in Minority Populations and Low Income Populations provides that each federal agency shall make achieving Environmental Justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations. This Order makes its clear that its provision applies full to programs involving American Indians.</p> <p>Previously, the DRC presented text in the NAFB LEIS which included a discussion of Environmental Justice and the disproportionate impacts to American Indian communities who have cultural affiliation with the NTTR. Some pointed examples include holyland and access violations creating a disconnect in the perpetuation of religious ceremonies guaranteed under the American Indian Religious Freedom Act and Executive Order 13007 Access to Sacred Sites. No other group of people has experienced these types of obstacles.</p> <p>Moreover, culturally affiliated Indian tribes are now experiencing a disproportionate amount of impacts relating to this project which is centered within the aboriginal lands of the Southern Paiute, Western Shoshone, Owens Valley Paiute and Mojave people. Clearly, there is the perception that this project is intentionally being proposed within the western portion of the United States and within the Consolidated Group of Tribes and Organizations' Regional of Influence. In order to fully understand the implications of Environmental Justice, the text should be expanded to include the information presented by the DRC both currently and previously. Additionally, supporting data should be included within the body of the EA address these issues to insure completeness of the information presented for analysis.</p>	<p>Environmental justice issues related to holy land and access violations that are associated with the renewal of land withdrawal that was analyzed in the 1999 LEIS, are not specific issues relevant to the JSF IOT&amp;E program because the LEIS provides for holy land and access.</p> <p>As stated under "Narrowing Criteria, MRTFB, Required Criteria" in Section 1.2, Purpose and Need, a) the location of this project was based on utilizing the MRTFBs b) the MRTFB should have flight test or aerial combat capabilities, and c) that the MRTFB be located within the combat radius of the JSF. Most of the MRTFBs fulfilling the criteria are located in the western states.</p>

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
12	<p>Section 4.2.2. - The real and perceived changes in noise levels are based on information that does not coincide with American Indian epistemology. The data contained on Table 4.2.9 attempts to provide a comparative analysis of the average dBA using different types of aircraft flown on the NTTR. The DRC is aware that many of the geologic features within the NTTR have unique acoustical properties that further amplify sounds thus increasing the dBAs which is not considered nor presented.</p> <p>The existing text suggests that most animals have acclimated to the increase noise levels and according to research conducted by the Air Force in 1999 on Desert Tortoise, the same findings were confirmed. The DRC questions these findings and recognizes that while some adaptations may have occurred, not all are understood. Many animals including the Desert Tortoise have religious overtones that are not included in the analysis. Like humans, animals respond to changes in noise levels depend on many factors including: quality of sound, the magnitude of the change, the time of day at which the changes take place, whether the noise is continuous or intermittent making the animal skittish anticipating unexpected changes. Moreover, human ability to perceive changes in noise levels varies widely with the individual as it does in individual animals.</p> <p>The dBAs appear only to focus on sound emitted from overflights including subsonic and supersonic aircraft. The analysis does not appear to include the noise generated air-to ground weapon releases, aerial target launches and air-to-air live missile shots that have implications to animals, their habitats and other important cultural resources. Therefore, based on these perceptions, the DRC recommends the Air Force conduct expanded studies using acoustical differences deriving from geological features to compensate for this disparity and adequately address the impacts to both humans and animals.</p>	<p>Currently accepted Air Force noise models do not contain modules for analyzing terrain effects on noise (the Navy Noise Model does). The next generation Air Force noise model will contain terrain effects but is still under development. Features on the NTTR that could amplify sounds would have the same effect on noise from any aircraft operating on the range. This would not be specific to the F-35, therefore, a comparative analysis to noise from other aircraft currently operating on the range is valid.</p> <p>As stated in Section 4.2.3.2.4, in 2003 the USFWS issued a biological opinion concluding that training activities on the NTTR would not jeopardize the continued existence of the desert tortoise or destroy or adversely modify critical habitat for this species. This applies to all activities occurring on the NTTR.</p> <p>JSF IOT&amp;E activities would represent a very small portion of training activities occurring on NTTR. A total of three inert weapons releases would occur as part of IOT&amp;E, while in 1995 1,944 inert weapons releases occurred on the NTTR. The noise impact from these three inert weapons releases would be minimal compared to that from ongoing use of target sites on NTTR. No aerial target launches or air-to-air live missile shots are proposed for NTTR. The Air Force is developing a next generation noise model that includes modules analyzing terrain effects on noise.</p>

**Responses to Comments**  
**Regulatory Consultation and Draft Environmental Assessment/Overseas Environmental Assessment**  
**F-35 IOT&E**

#	COMMENT	RESPONSE
13	<p>Section 4.3 - Since there is no evidence or data from systematic studies to support no short-or long-term significant impacts within these areas, it is difficult to concur with the conclusion.</p> <p>Upon examining this document in its entirety, there is no empirical data to conclude there will be no impacts to socioeconomics or cultural landscapes. Equally, there is an absence of ethnographic information that indicates the current land use and contains descriptions of the culturally perceived desert aesthetic. Further, no culturally based studies evaluating actual or perceived impacts to water, biological and cultural resources have been conducted leaving these topical areas incomplete and misunderstood. Only 4 resource areas were considered resulting in an incomplete opinion and analysis.</p> <p>Upon further examination, no consideration is given to bird/wildlife aircraft strike hazards, especially those identified as Class B or C Mishaps. This information is useful and consistent with other documents relating to the F-35 Strike Fighter.</p>	<p>Under 40 CFR 1500.4(i) the preparer can tier off of other EAs and EISs of a broader scope to a narrower scope to eliminate repetitive discussions of the same issues. This enables the preparer to develop a concise document that briefly provides sufficient evidence and analysis for determining to prepare an EIS or a FONSI. The NEPA documents used in the tiering process are presented in Chapter 8, <i>References</i>, along with other documents used for guidance and information. These documents contain the empirical data and analysis upon which the results of the analysis were based. To have excerpted it in its entirety would have increased the bulk beyond NEPA's intent to promote concise documents.</p> <p>A careful analysis of the potential effects of the JSF IOT&amp;E was conducted to identify significant environmental issues that needed to be further analyzed and to deemphasize those that were not, this process is identified under 40 CFR 1501.1(d). The initial analysis indicated that JSF IOT&amp;E activities may have a potential effect on air quality, noise, biological resources, and environmental justice but would not have a significant effect on socioeconomics, cultural resources, land use and the remaining resources that are typically studied during the initial stages of scoping. The rationale for not devoting further analysis to socioeconomics, cultural resources, and land use was explained in Section 1.4, <i>Scope of the Environmental Assessment, Resources</i>. Upon receipt of the CGTO comments many recommendations have been incorporated into this EA.</p> <p>There would be no change in existing conditions relevant to bird/wildlife aircraft strike hazards. The proposed beddown of the F-35 at Nellis AFB would result in more than 50,000 sortie-operations on the NTTR annually. JSF IOT&amp;E activities would result in a maximum of 4,200 sortie-operations (700 sorties) on NTTR during Block 3. The much greater activity level that would occur as a result of beddown presents a greater potential for impacts and it is appropriate that the NEPA document for F-35 beddown, an EIS, would provide more details and analysis than are needed in this EA for IOT&amp;E.</p>
14	<p>Chapter 5.0 - The table omits tribal governments and Tribal Historic Preservation Offices which has similar standing to State Historic Preservation Offices. This oversight should be corrected and appropriately identified in this Table.</p>	<p>American Indian groups that were consulted with have been added to Chapter 5.0.</p>